Annual Report of the Ontario Ministry of Energy

FOR THE FISCAL YEAR

1982/83

Ontario

Front cover: The Ontario Ministry of Energy is working to ensure the energy security of the three major energy-consuming sectors of our society – residential, industrial and transportation. Ontario's goal is to increase the percentage of primary energy produced here in the province to more than one third of our total needs by 1995.

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Minister

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September 1983

TO THE HONOURABLE JOHN BLACK AIRD
O.C., Q.C., B.A., L.L.D.

Lieutenant-Governor of the Province of Ontario

MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the tenth Annual Report of the Ministry of Energy for the fiscal year ended March 31, 1983.

Respectively submitted

Philip Andrewes
Minister of Energy

The Honourable Philip Andrewes
Minister of Energy

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September 1983

TO THE HONOURABLE PHILIP ANDREWES
Minister of Energy, Ontario

Sir:

I have the honour to present the tenth Annual Report of the Ministry of Energy for the fiscal year ended March 31, 1983.

Respectively submitted

Glenn R. Thompson
Deputy Minister

Deputy Minister's Summary

It is now 10 years since this ministry came into existence. It is also 10 years since OPEC became a household word.

During those 10 years, world oil prices have increased greatly — from $2.64 U.S. per barrel to the current price of $29 U.S. As a result, the economies of the industrial nations have undergone tremendous shocks. Indeed, we are still coping with the recession caused by the 1979 price increase.

The effects of the recession, combined with conservation, began to change the demand for oil in the early part of the decade. As a result, the 13 OPEC nations were forced to set a lower price and to reduce production for the first time in OPEC's history in March 1982.

Since then, the world has experienced lower prices and an over-supply.

Some may think this oil surplus means we're finally back to "business as usual." But by all accounts, the surplus is a temporary phenomenon that will disappear when world economies recover from the recession.

And then, what?

If the last decade has taught us anything, it is that Canada must stop depending on world oil suppliers. Futurist Dr. Daniel Yergin put it succinctly: "Glut can turn to shortfall on little more than an assassin's bullet, and the orderly and reasonable functioning of markets can be brutally overwhelmed by an upheaval and the sudden panic of the unprepared."

Preparing for the future

During the past several years, Canada has had to import as much as 25 per cent of its oil. In the past year the recession eased that dependence.

But, as the International Energy Agency has warned, many countries' dependence on imported oil will increase in the years ahead unless they take steps to find their own oil, conserve or substitute other fuels for oil.

Oil may be in surplus this year, and perhaps next year. But we must not lose sight of the fact that in the long term it will be in increasingly short supply.

In Canada, the current rate of use from established reserves in the western sedimentary basin in Alberta means a rapid decline in the amount of oil we can obtain from this source. Other oil supplies, such as those in the MacKenzie Delta, the Beaufort Sea and Hibernia, will be expensive. But they must be developed if Canada is to achieve energy security.

Ontario's significant investment

For almost a decade now, the Ontario Energy Corporation, (which was established by the Government of Ontario in 1975 with the Minister of Energy as its sole shareholder), has been investing in and encouraging projects to find and develop more oil and natural gas.

Among its major investments are Suncor and its creation of the Trillium Exploration Corporation. With Ontario's significant investment, Suncor can take advantage of new incentives for the development of Canadian petroleum sources.

By establishing the Trillium Exploration Corporation in partnership with Suncor, the Ontario Energy Corporation will expand the development of Canada's oil and gas resources. This venture, which is primarily Canadian owned, will be able to take avantage of sizeable federal incentive grants. The OEC is currently participating in exploration off the coast of Labrador and in the Arctic Islands.

A third OEC venture to discover more oil and natural gas, involves OEC with two private sector partners. The consortium has signed an agreement with the federal government to explore for oil in 29, 149, 794 hectares (or 72 million acres) in Hudson Bay. This is the largest single exploratory parcel of land ever granted in Canada.

The case for conservation

Nearly all of our oil, gas and coal is bought outside the province. The cost — approximately $9 billion last year alone — represents a significant transfer of the gross provincial product. This cost, alone, is a good reason to conserve.

The ministry provides consumers with the latest energy information to make homes more energy-efficient, to make a tank of gas last longer, or to assist a business run more efficiently. The ministry also helps develop more energy-efficient technologies and techniques, with applications in all sectors.

A grass roots approach

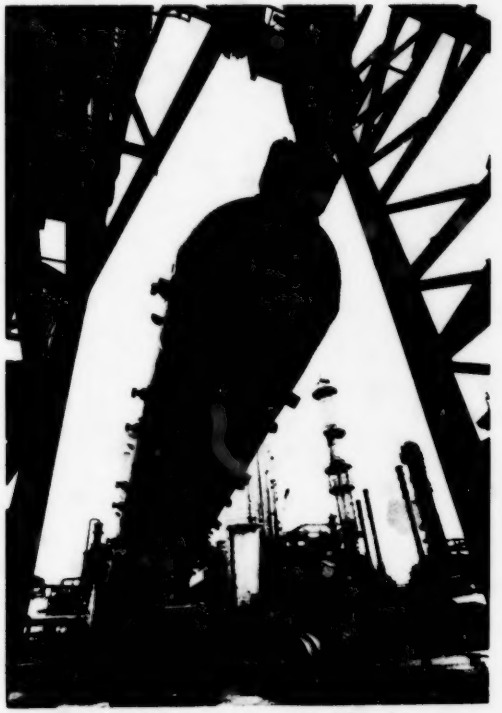
Involvement at the grass roots level was a major theme of the year. Our community energy management projects enjoyed a high degree of enthusiasm among participants; a necessary ingredient since success depends upon the efforts of local people and institutions.

It is a process that works well, judging by the experiences in the community-based action projects funded last year — Energy Savers Peterborough, the Peel Urban Centre and the Toronto Energy Conservation Community Outreach (ECCO) Project.

In Peterborough, for example, local volunteers, representing broad areas of the community, implemented a year-long energy awareness program. Among the projects they started were: a storefront energy conservation centre in the downtown core, a tire-check clinic, an automobile emission clinic and a tour of local energy-efficient homes.

The energy conservation audience is vast. Since everyone is an energy user, everyone is a potential energy saver. Consequently, our residential conservation programs aim at a broad audience. This past year we initiated a program of co-marketing with private sector interests.

During the fall, the ministry worked with hardware



Suncor, which is partially owned by the Ontario Energy Corporation, is installing this $355 million hydrocracker at its Sarnia refinery. The hydrocracker will permit the same volume of transportation fuels to be produced with one third less crude oil

In this energy-efficient house, an airlock entry prevents outside air from affecting the indoor temperature. Homes designed with energy-efficient features are attractive and comfortable to live in.

stores in Ontario to market insulation materials for energy conservation around the home.

This campaign was conducted with the support of Canadian Tire, Dominion Hardware, Home Hardware and independent hardware stores.

The hardware store campaign ran in conjunction with the ministry's television commercial "the Conserving House."

Another community-based conservation effort revolves around the voluntary action taken by more than 175 municipalities — representing more than 80 per cent of Ontario's population.

Programs administered by the Ministry of Energy have provided municipalities with funding and technical knowledge to accelerate their energy conservation efforts.

As one example, the City of Mississauga saved more than $700,000 between 1979 and 1982, and its city hall used almost 60 per cent less energy and 78 per cent less water during the same period.

A house that saves energy also saves money

By the year 2000 homes which are not energy efficient will have a much lower market value than those which are.

While still in its infancy, energy-saving design and developmental activity is taking place in all parts of the province. Ontario's designers and home builders are showing ingenuity, innovation and leadership in this new approach to home building.

The Ministry of Energy supports this change in the housing market. To accelerate the development of this technology, the ministry initiated a project to demonstrate the feasibility of building up to 50 low energy houses, some of which also incorporate passive solar energy features. Last year the subdivision sites chosen for the demonstration were in Freelton, Brampton, and Ottawa.

The program, managed by the Housing and Urban Development Association of Canada (HUDAC) marks a new approach to subdivision development. These energy efficient homes look no different than conventionally constructed houses.

But they are different. The proof is in their low heating bills and improved comfort levels. Space heating needs will be up to 80 per cent *less* than those of conventional homes of similar size. Although low energy homes are still not commonplace, they are a growing alternative and provide the consumer with a sensible and economical approach to home ownership.

Conserving on the job

Ontario's industries use approximately 10 per cent of all the province's crude oil as well as 40 per cent of Ontario's secondary energy; such as electricity, gasoline and other refined petroleum products.

Industries have to reduce these costs to keep a competitive advantage. Switching from oil to other energy forms, such as gas or electricity is one way. Increasing the efficiency of plant equipment through retrofits is another. Some are developing new energy conservation approaches that use novel equipment.

The Industrial Energy Conservation and Oil Substitution Program has provided close to $9 million of grant money which has encouraged a total investment of close to $45 million in projects to improve energy efficiency.

Making a factory into an energy efficient operation is no easy task. It takes commitment and investment at a time of tight money. However, as many owners and managers are discovering, it is the only way to compete.

For a more detailed account of energy-conserving initiatives in Ontario, please turn to the Conservation section.

The new technologies

During the past several years, the ministry has helped develop a number of promising new technologies to supplement or replace fossil fuels to protect the energy future of the Ontario consumer. To do this, Ontario must move towards an energy mix based increasingly on renewable and, essentially, *inexhaustible*, sources of energy.

Among the most promising for Ontario are water power, energy from waste, solar energy, wind power, and more advanced forms such as nuclear fission, fusion and hydrogen.

The ministry's Alternative and Renewable Energy Program was created to assist the private sector in making the crucial energy decisions and investments.

About half of Ontario's crude oil is used by the transportation sector, so the ministry concentrates a great deal of effort on this sector. Among our initiatives we are encouraging development of a wide range of substitutes through the five-year, $75 million Alternative Transportation Fuels Program, announced in 1980.

A partnership

By funding a wide variety of projects, the ministry helps set up new energy industries in Ontario and helps develop technology that will be essential when fossil fuels prove increasingly more difficult to obtain.

Effective alternative and renewable energy systems are in operation across the province: from industrial wood waste systems to swimming pools relying on solar heat.

Alternative fuel applications are also in practical use. Consumers' Gas System is demonstrating compressed natural gas (CNG) in a full-scale commercial fleet.

Both CNG and propane technologies have come a long way in the past several years. However, some still have a long way to go before they are commonplace.

There are other avenues worth exploring too. The six million tonnes of garbage Ontario produces every year could be a valuable source of energy and material. Each tonne could yield about the same amount of energy as one barrel of oil when burned.

Wood and wood residues, such as sawdust, bark and wood chips from forest industries could provide another source. Wood energy systems now on the market can convert wood and wood residues to hot air, steam, electricity and even wood gas, a gas that can replace natural gas for some industrial uses.

In the Alternative and Renewable Energy section of this report, you will find a list of the projects now underway in Ontario, including a hospital in London, a landfill site in Kitchener, a private high school near Brockville, a greenhouse operation in Kettleby, and a correctional centre in Guelph.

While the technologies differ, they all have one crucial thing in common — all use energy systems based on renewable sources or new applications of conventional fuels.

A shared responsibility

As mentioned earlier, the Ministry of Energy has a responsibility to every person living in the province.

But to fulfill this responsibility it is essential that we have the cooperation of many other ministries in the Ontario government.

More than 50 per cent of our energy conservation budget is spent through other government ministries to deliver our energy programs directly to the public.

Without the involvement of ministries such as Transporation and Communications, Industry and Trade, Agriculture and Food, Government Services, Municipal Affairs and Housing, we would be unable to reach the broad mosaic of Ontario society.

The ministry looks forward to continuing this relationship into the new fiscal year as we work together on the many energy-related programs in place throughout the government.

Wood residue from the forest industry can be converted into wood gas and replace natural gas for several industrial applications.

Federal-provincial cooperation

In 1978, the governments of Ontario and Canada entered into a five-year, jointly funded, $58 million program to sponsor the development and application of innovative, energy-conserving and renewable energy technologies.

This cooperative effort, called the *Canada/Ontario Conservation and Renewable Energy Demonstration Program*, or EnerDemo, has been instrumental in the development and testing of many new energy technologies.

The program was designed to bridge the gap between research and the implementation of new energy technologies, create employment in new and existing industries and foster technology transfer to the private sector.

Financial incentives for individual projects are shared equally by both levels of government, with the private sector financing the rest.

One of the most interesting features of the program is its diversity: it touches nearly every dimension of Canadian society and shows there can be new approaches to the use of energy for shelter, transportation and industry.

For example, it helped finance an innovative industrial heat recovery system that chopped 65 per cent from the space heating costs of PPG Industries Canada in Owen Sound. And Peel County will soon have the most energy efficient sewage treatment plant in the country. A $3 million system, partly funded by the program, will turn sewage sludge into fuel for waste treatment.

To help ensure that the lessons of these energy demonstrations are transferred to potential users, a computerized energy projects data base lists key technical and economic data together with points of contact for further information.

Thanks to the data base, business and industry will have at their disposal, an up to date and extensive source of energy information. The information will serve manufacturers of energy-related products as well as commercial and individual consumers.

Indeed, this is already taking place. The solar industry is a good example. Largely based in Ontario, this industry has greatly improved its technical know-how in the past few years, with a number of firms successfully penetrating foreign markets.

Technical information on many of the industry's successful demonstrations now reside in the data base.

Working towards a secure future

In this summary, I have given an overview of the activities of the Ministry of Energy. All of our activities have a single common goal: to ensure the energy security of the people of Ontario.

The past decade had its share of uncertainties and crises. In the Chinese language, there is a symbol for crisis that has both a top and bottom part. The word crisis represents both danger and opportunity.

That Chinese ideogram could symbolize the current energy situation. If we focus on the upper half, we see only danger, difficulties and problems. If we focus on the bottom half, we see a better future and endless opportunities.

The difficulties, of course, are very real. For instance, that assassin's bullet of which Daniel Yergin warns could embroil the energy producers in war and there is the ever-present danger of shortage and blockades.

But there are opportunities as well — new technologies and new job-creation possibilities; more energy efficient ways to do business, heat and cool our homes and run our cars.

At the Ministry of Energy, we are mindful of the dangers but we believe in the possibilities, and will continue to work toward them for the benefit of all the people living in Ontario.

Highlights of Ministry Activities, 1982-83

The following highlights of Ministry of Energy program and policy initiatives during the past fiscal year include cooperative efforts with other government and private agencies. The Ministry of Energy and Energy, Mines and Resources Canada are currently working together on several projects funded under the Canada/Ontario Conservation and Renewable Energy Demonstration Program or 'EnerDemo'.

1982

April 1

The Kortright Centre of the Metro Toronto and Region Conservation Authority receives a renewable energy program grant of $235,000 from the Ministry of Energy. The Ministry of Natural Resources will administer the grant.

April 15

The Ontario and federal governments each contribute $142,000 under the EnerDemo program to help Consumers' Gas System of Toronto demonstrate the economics of using compressed natural gas (CNG) in a full-scale commercial fleet.

April 16

The Ministry of Energy and Energy, Mines and Resources Canada each contribute $78,000 to the Foothill Greenhouse Ltd. wood waste program for this EnerDemo project.

April 27

The Ministry of Energy announces that ten remote Indian villages will undergo an energy audit as part of the Northern Community Energy Assessment Project. The ministry, the federal government and the Kayhana Council of Indian Chiefs will be participating.

April 27

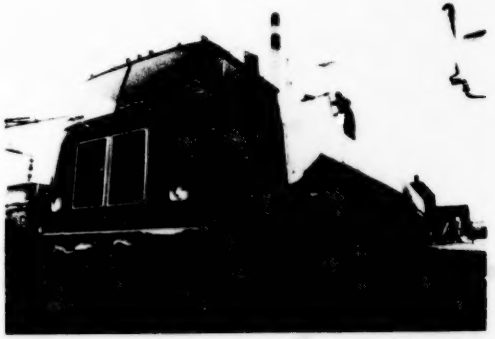
The Ministry of Energy announces it will undertake hydraulic wind and wood demonstration projects as part of its Remote Power Program.

May 5

The official start-up of solar energy systems at McDonald's Restaurants coincides with Solar Energy Day. The systems were funded by the Ministry of Energy under the Commercial/Industrial Solar Demonstration Program.

May 5

Energy Savers Peterborough (ESP), a program which encourages public involvement in energy conservation, is launched.



Transport trucks consume vast quantities of energy each year. As part of the Transportation Energy Management Program (TEMP) operated through the Ministry of Transportation and Communications, the Trucksave program promotes increased fuel efficiency for transport trucks. This year it attracted 62 drivers, owners and operators to its Fuel Economy Challenge '82.

Community Energy Action programs in four Ontario communities this past year generated a great deal of enthusiasm and participation at the grass roots level. Energy Savers Peterborough organized this highly successful tire check clinic. Properly inflated tires improve fuel efficiency by four per cent.

May 12

A two-year, Canada/Ontario demonstration study to analyse off-peak electricity rates begins. The ministry and the federal government will each contribute $200,000 to this EnerDemo project.

May 14

Minister of Energy Robert Welch attends the official start-up of the solar heating unit at the Coral Motel in Niagara Falls. The ministry provided $13,500 for this domestic hot water heating system.

May 20

As part of its Commercial/Industrial Solar Demonstration Program, the Ministry of Energy contributes $103,500 towards the installation of a solar hot water preheat system at St. Andrew's Place, Sudbury.

May 20

Representatives of business and the federal and Ontario governments meet in Ottawa to discuss ways to conserve energy in downtown buildings at the ministry's Downtown Forum.

May 31

BEST (Big Energy Saving Team), a program for Ontario's 80,000 public servants, is officially launched at a noon rally in Queen's Park. BEST encourages conservation on the job, on the road and at home.

June 3

The federal and Ontario governments announce they will each contribute $104,000 under the EnerDemo program toward the installation of a ground water cooling system for Westinghouse Canada's Renfrew plant.

June 11

Two publications, one, on fuelwood consumption in Ontario and one on woodlot management, prepared jointly by the Ministries of Energy and Natural Resources, are released today.

June 13

Woodfire '82, the Canadian Wood Energy Institute's annual conference and trade show, which encourages the use of wood energy, opens at Toronto's International Centre. The Ministry of Energy provides financial assistance.

June 16

The Grand River Conservation Authority receives $120,000 from the Ministry of Energy to install an 80 kW micro hydro facility on the Speed River in Guelph. The project is expected to produce enough electricity for the yearly needs of 25 to 30 homes.

June 21

A solar system to preheat water for washing equipment and for the manufacturing process officially opens at Scherer Gelatin Capsules Ltd. in Windsor. The Ministry of Energy provided a $200,000 grant through its Commercial/Industrial Solar Demonstration Program.

June 23

Funded by the Ministry of Energy, a solar water heating system for domestic and industrial use at the Guelph Correctional Centre officially opens. The Ministries of Correctional Services and Government Services participated in the project.

July 9

Minister of Energy Robert Welch announces that efforts to create employment in the Elliot Lake area will be intensified and assistance will be given to Bancroft miners affected by severe cutbacks.

July 20

Draft legislation, allowing Ontario Hydro to develop the Bruce Energy Centre, is introduced to amend the Power Corporation Act. A $1.7 million BILD grant was provided for the initial construction stage of the plant's steam pipeline.

July 26

Suncor announces plans to construct a $335 million hydrocracker facility at its Sarnia refinery. The refinery will be able to cut its use of crude oil by one third while producing the same volume of transporation fuels.

August 16

Twenty-seven Ontario companies will share $2 million, awarded under the Canada/Ontario Solar Demonstration Agreement, to help finance active solar energy systems for commercial/industrial applications.

August 23

The Ministry of Energy will contribute $400,000 towards the construction of five greenhouses built by the Ministry of Agriculture & Food. This $1.5 million project allows researchers to develop new energy management technology.

August 26

The Ministry of Energy provides $42,000 for an active solar energy system which heats water for two swimming pools at Hamilton's St. Elizabeth Village – a senior citizen complex. Financed under the ministry's Commercial/Industrial Solar Demonstration Program, the village is also receiving federal funds for solar domestic hot water systems.

August 26

The Ministry of Energy announces plans to construct 50 energy efficient houses in three Ontario subdivisions under the $550,000 Low Energy/Passive Solar Housing Demonstration Program.

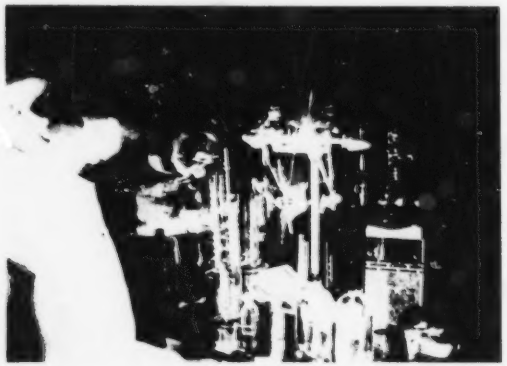
August 26

A water source heat pump, using well water to heat and cool a recreational complex in the Town of Valley East near Sudbury, is to be built under the EnerDemo program.

September 9

The Ministry of Energy announces that four one-day forums on conserving energy in religious buildings will be held during the next six weeks across Ontario. Financed by the ministry, Ontario Hydro and the Ontario Natural Gas Association are also participating.

The Canada/Ontario Conservation and Renewable Energy Demonstration Program (Enerdemo) sponsors the development and application of energy conserving technologies such as this solar heating system at Kincardine's indoor community swimming pool.



Hydrogen could be 'the' transportation fuel of the future. The Institute for Hydrogen Systems at the University of Toronto received a $10 million grant (for a five year period) from the ministry to develop hydrogen's commercial potential.

September 20

Project Heat Save, a Ministry of Energy program offering free advice to homeowners on reducing heating costs, arrives in North Bay. Free clinics are to be held through October 2.

September 20

After completion of a Ministry of Energy survey of the Port Hope and District Hospital's energy conservation potential, the Ministry of Health announces that nearly $50,000 will be given to the hospital for energy conservation projects.

September 23

Canada's largest solar project – which will heat more than half a million litres of laundry water per day – opens at Mohawk Hospital Services Inc. in Hamilton. The federal government and the ministry each contributed $600,000 under the EnerDemo program.

September 27

The Small and Micro Hydro Workshop, designed to facilitate information exchange on small scale water power and sponsored by the Ministry of Energy, is held at the Inn on the Park in Toronto.

September 29

Heat Save arrives in Peterborough. Free clinics for homeowners interested in energy conservation are held through October 16.

October 4

Energy Minister Robert Welch announces that funding of up to $50,000 per municipality is available for energy conservation and retrofit projects under the Municipal Oil Conversion and Energy Conservation Program.

October 13

The Ministry of Energy and the City of Hamilton select the energy efficient muli-housing design of Sunshine Homes of Hamilton as the $10,000 winning design for a former school site in a mature residential neighbourhood.

October 26

The Ministry of Energy announces the EnerDemo project to demonstrate the scientific and commercial aspects of a new method of converting wood residues into ethanol for transportation fuel.

December 6

Project Heat Save visits the Town of Whitchurch-Stouffville until December 11.

December 14

Minister of Energy Robert Welch announces the signing of a $193,420 contract for a 15-month study, in cooperation with Onakawana Development Ltd., of techniques for producing fuels by the liquifaction of lignite from northern Ontario.

December 15

The Minstry of Energy and Energy, Mines and Resources Canada announce each will provide $30,000 towards a heat recovery system to supply the domestic hot water and space heating needs of Scarborough Centennial Centre. This is an EnerDemo project.

December 16

Three ventilation techniques to control humidity build-up and reduce fuel consumption, will be tested at a new, energy efficient housing cooperative in Toronto. The Ontario and the federal governments are each contributing $44,554 to this EnerDemo project.

1983

January 26

The North Bay Heat Save Shop officially launches its full services for local residents. Funded by the Ontario and federal governments, the shop helps homeowners reduce heating costs.

Janurary 27

The Ministry of Energy announces plans to fund Phase I of the Kitchener Landfill Gas Utilization Project — a project which could provide a valuable new energy source for local industry.

February 1

A solar system to preheat boiler feed water at the Campbell Soup Company opens as part of Phase II of the ministry's Commercial/Industrial Solar Demonstration Program. The provincial and federal governments will each contribute $1,100,000.

February 3

Robert Welch, Minister of Energy, agrees to provide $10 million over five years for the new Institute for Hydrogen Systems.

February 7

The Ministry of Energy announces that Project Heat Save will visit Whitby, Thorold, Cambridge, Ayr, Owen Sound, Niagara-On-The-Lake, Niagara Falls and Ottawa over the next two months.

March 7

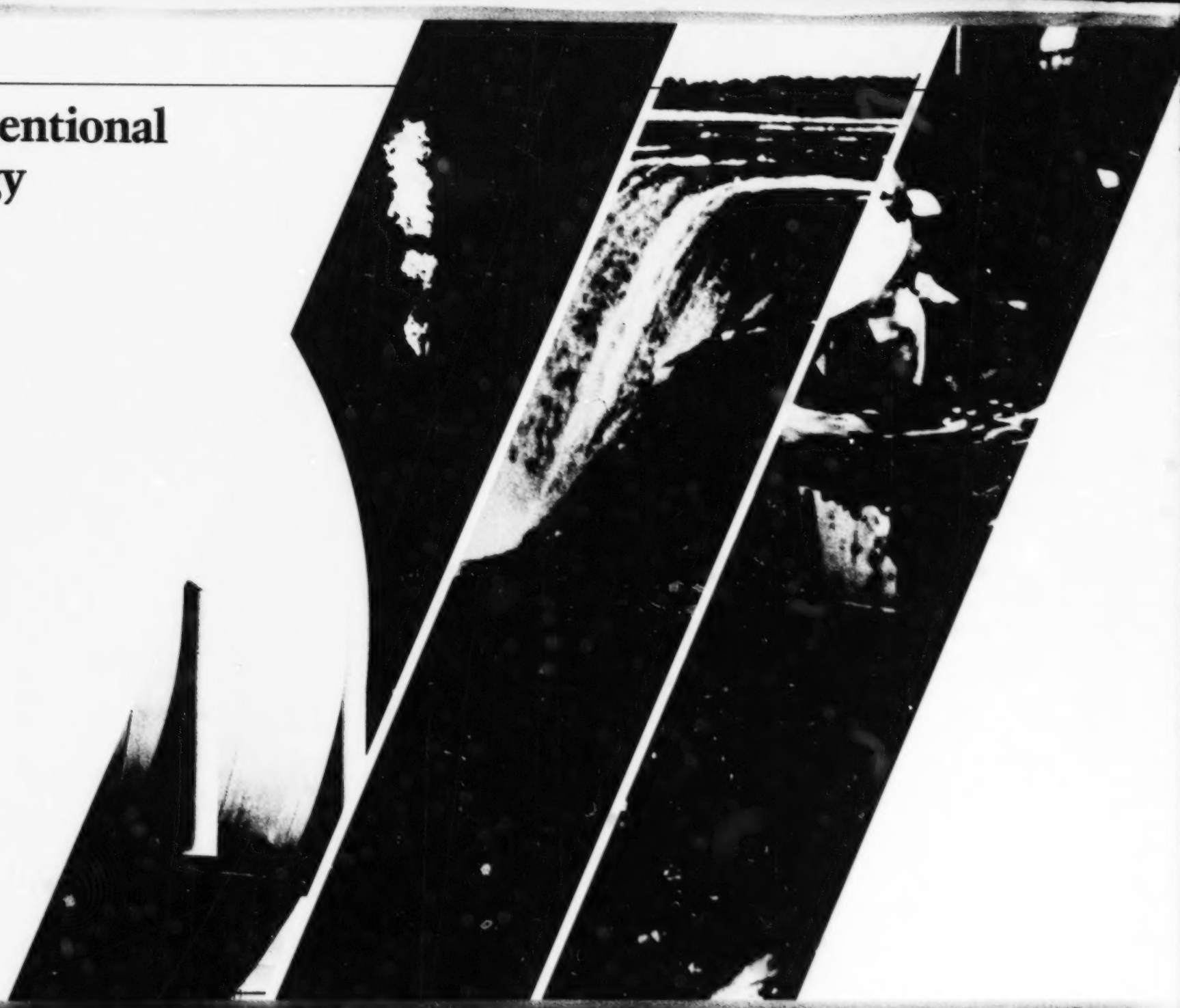
A five-year, $5 million, incentive program is launched to encourage the province's greenhouse operators to employ energy efficient techniques. The program is jointly sponsored by the ministries of Energy and Agriculture & Food.

March 7

International experts in the field of energy from waste and biomass attend the opening of ENERGO '83, an international conference sponsored by the Ministry of Energy.

Talisman Resort, south of Owen Sound, installed an active solar heating system for its outdoor swimming pool as part of the ministry's Commercial/Industrial Solar Demonstration Program.

Conventional Energy



Electricity

The Ministry of Energy monitors electricity supply, demand and pricing issues as well as Ontario Hydro's plans and programs in order to advise the government on electrical power policy. As part of these responsibilities the ministry met with representatives of the electricity industry.

In 1982/83 uranium (nuclear power), water power (hydraulic) and coal (thermal) were the major sources of Ontario's electrical production. Electricity filled more than 15 per cent of Ontario's secondary energy needs in that year.

Electrical demand

For the first time since World War II, the growth of Ontario Hydro's annual load decreased. Despite this decline in 1982/83, due mainly to economic conditions, Ontario Hydro is forecasting that electricity demand will grow at an average annual rate of 2 per cent to the year 2000. This level of annual growth is lower than the 5 to 7 per cent increases that were forecast when decisions were made to build additional generating capacity in Ontario.

During 1982-83, increases in interest rates, combined with revisions to construction schedules, increased the projected capital costs for this new generating capacity. Despite these factors, construction of the major new generating facilities proceeds. In the long term, this additional capacity will be required to meet electricity demand in the most economical manner. The construction will also provide economic activity, increase provincial energy security and help meet environmental goals. Electricity rates will experience upward pressure as these new plants come on stream, beginning in 1983.

Ontario Hydro's new corporate strategy

In August 1982, the Ontario Hydro Board of Directors adopted a significant change in its corporate direction for the 1980's. This strategy is designed to capture a larger share of the domestic and export energy markets by maintaining financial flexibility and moderating electricity price increases. Ontario Hydro is cutting costs and borrowings through program reductions and deferrals. Two units of the Darlington generating station have been deferred for two years and are now scheduled to be completed in 1992.

Ontario Hydro is also examining business opportunities outside its traditional field of electricity generation and distribution to take advantage of its technical and management expertise and to market its other products such as steam, tritium, cobalt and heavy water.

Memorandum of Understanding

In December 1982, the Minister tabled in the Legislature a Memorandum of Understanding between the Minister of Energy and the Board of Directors of Ontario Hydro. It clarifies the objectives and priorities of Ontario Hydro and sets out the operating relationships between Ontario Hydro and the Minister of Energy. The Memorandum recognizes the responsibility of the Board of Directors for the control and direction of Ontario Hydro, and indicates that the Board agrees to carry out its responsibilities in harmony with government policy.

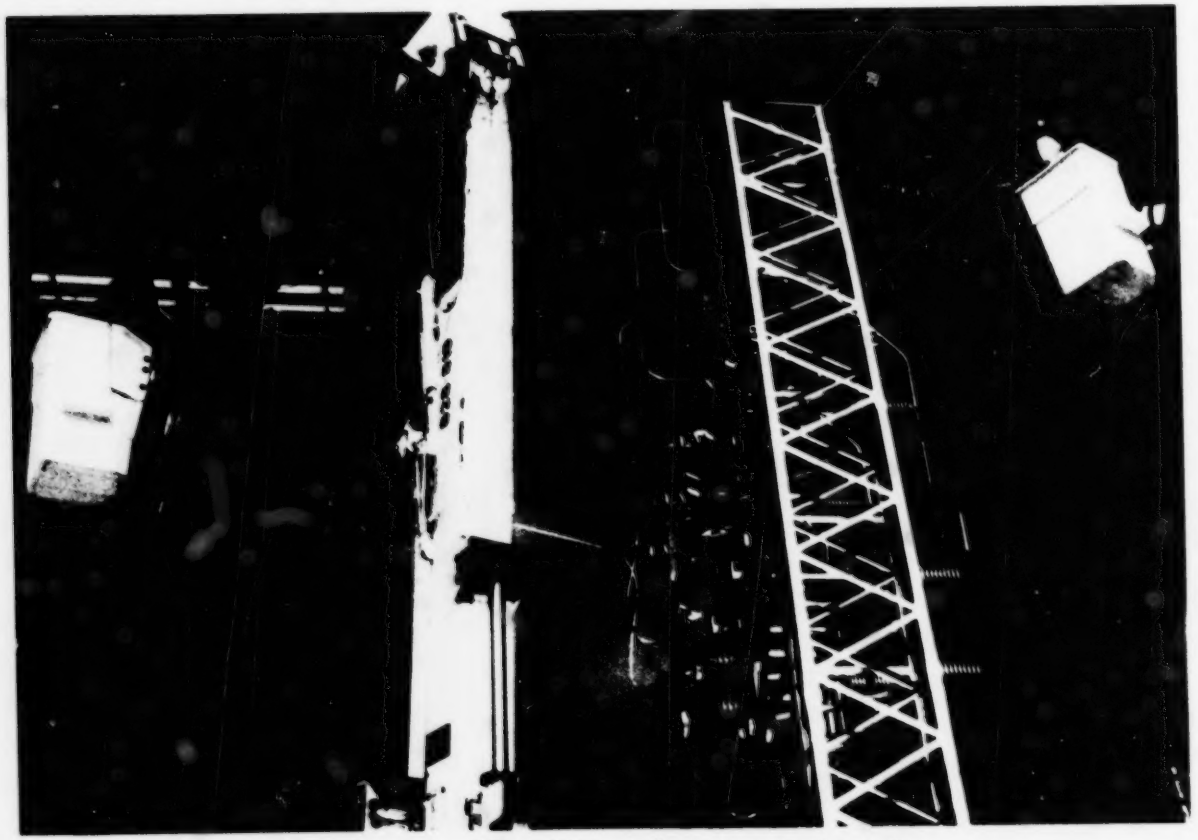
Electricity rates

In February 1982, the Chairman of Ontario Hydro submitted a proposal to the Minister of Energy to increase 1983 bulk power rates by 13.9 per cent. The proposal included changes to the costing and pricing policy for municipal utilities and direct customers.

The Minister referred the proposal to the Ontario Energy Board (OEB) for review. After two months of hearings, the OEB recommended that the rate increase for 1983 be reduced to 8.8 per cent, due mainly to revised economic forecasts and net income which was lower than proposed levels.

The Minister requested Ontario Hydro to introduce rates that would reflect the recommendations of the OEB and the government's restraint program and to defer the implementation of revised costing and pricing

Opposite:
Although "new" sources of energy are currently being developed and marketed, conventional energy – hydroelectric power, fossil fuels and nuclear power – will continue to play an important role in Ontario's energy future. The Ministry of Energy monitors conventional energy supply, demand and pricing.



Electricity supplies more than 15 per cent of Ontario's secondary energy requirements.

policies and reconsider their impact on customers.

In October, the Ontario Hydro Board of Directors approved an average increase of 8.4 per cent in 1983 bulk power rates to municipal utilities and direct individual customers and agreed to apply these increases under existing costing and pricing practices.

The Ministry of Energy worked closely with Ontario Hydro to incorporate the inflation restraint criteria within its normal rate approval process with regard to municipal and private rates.

The Bruce Energy Centre

In June 1982, the Government of Ontario asked Ontario Hydro to assume responsibility for the implementation of the Bruce Energy Centre project. The necessary amendments to the Power Corporation Act were presented to the Legislature on December 2, 1982 and given Royal Assent in February 1983.

In 1981-82, the Board of Industrial Leadership and Development (BILD) program funded the first stage of the steam pipeline from the Bruce Nuclear Power Development to the Bruce Energy Centre. In 1982, agreement in principle was obtained from BILD to fund the second stage of the steam transmission pipeline as well as the associated condensate return pipeline and steam distribution infrastructure.

Residential Energy Advisory Program

Through BILD and the Canada Employment and Immigration Commission, the Ministry of Energy, sponsored a job creation project to assist with REAP in the fall of 1982. The program provided funding to municipal hydro utilities to hire people who had exhausted their unemployment benefits and train them to provide the Residential Energy Advisory Program's (REAP) free, in-home, residential energy surveys.

Twenty-five utilities joined the program by March 1983 hiring 42 energy advisors. The program was extended to September 1983 to encourage further participation by the utilities.

Transmission facilities

In 1981/82 Ontario Hydro filed environmental assessments with the Ministry of the Environment for power transmission facilities in southwestern and eastern Ontario. As part of the environmental assessment process, the Ministry of Energy prepared reviews supporting the need for transmission facilities in these areas, and supporting plans for additional interconnection facilities with Hydro Quebec.

Ministry of Energy staff brought the reviews before a joint board, established under the Consolidated Hearings Act. Following these hearings, Ontario Hydro received approval to proceed with studies to identify and recommend specific routes for the required facilities. A further set of these hearings in 1984 should provide a final decision on the specific route of the transmission lines, based on Ontario Hydro's studies.

Research in fusion fuels technology

The Ministry and BILD continued to support a five year fusion development program with Ontario Hydro and the National Research Council.

Municipal hydro restructuring program

The ministry discussed plans to restructure electrical service areas in the regions of Haldimand-Norfolk, Muskoka and Sudbury. During the year, the ministry paid $294,000 in grants to previously restructured utilities to cover costs incurred due to organizational changes in the utility.

Northern Electrification Task Force

In October 1982, a task force chaired by the Ministry of Energy, began studying the electric power needs of areas of northern Ontario remote from the Ontario Hydro grid. The inter-ministry Northern Electrification Task Force is reviewing present facilities, services and rate structures and the need for and financing of future services.

Small hydro development

The ministry, in cooperation with the Ministry of Natural Resources, continued to encourage small hydro development. A joint program, the Inventory of Hydraulic Resources, has identified promising small hydro sites which will be offered for lease to the public. Under the EnerDemo federal-provincial demonstration program, up to $950,000 is available to help fund the development of at least five small hydro sites.

Fuels and raw materials

Crude Oil and Petroleum Products

The demand for crude oil and its products declined due to the combined impact of world wide recession and conservation. After a year of negotiations, members of the Organization of Petroleum Exporting Countries (OPEC) agreed at their meeting in March, 1983, to reduce the price of Arab light crude oil by $5 a barrel to $29 (U.S.) and to limit production to 27.8 million cubic metres (17.5 million barrels) a day.

In spite of the apparent crude oil surpluses, the International Energy Agency, which includes the major industrial oil consuming nations, warned against complacency by noting that the surplus is only a temporary phenomenon which could disappear when world economies recover.

During the 1982 fiscal year, Canada reduced the amount of oil it imports from 260.5 million cubic metres (164-million barrels) to 163.6 million cubic metres (103-million barrels) at the end of 1982. That represents a reduction in imported oil from 25 per cent of Canada's requirements in 1981 to 19 per cent at the end of 1982.

The framework for pricing most of Canada's oil and natural gas is the Canada/Alberta Agreement of September, 1981. In the fiscal year 1982-1983 the wellhead price for conventional old Canadian crude oil was $23.50. With scheduled increases as stated in the agreement, the wellhead price rose to $29.75 a barrel. In concert with declining world prices, this resulted in the Canadian blended price being very close to the world price.

The wholesale price of natural gas was maintained at a level that is 65 per cent of Canadian oil at the

Natural gas, primarily from Alberta and Saskatchewan, meets more than 20 per cent of Ontario's primary energy requirements. Above, a natural gas pipeline is being laid through nothern Ontario.

Consumers accustomed to paying high prices for gasoline have enjoyed a series of reprieves this year. Reduced demand for oil products, combined with more fuel efficient vehicles created a temporary surplus leading to sporadic outbreaks of gas wars.

Toronto city gate in accordance with the Canada/Alberta Agreement. In light of declining world oil prices the federal government undertook to adjust its excise tax on natural gas to maintain the 65 per cent parity.

Exploration activity declined significantly due to lower than expected prices for new oil, high interest rates and reduced demand. Nonetheless, significant discoveries were made in the frontier areas. In the Beaufort Sea, Imperial Oil's well at West Atkinson showed promising results. At Cape MacMillan in the Arctic Islands, the Trillium Exploration Corporation, a subsidiary of the Ontario Energy Corporation and Suncor, is participating in a significant oil and gas find.

The reduced demand for oil products such as gasoline, had a major impact on the oil companies' operations. Retail sales of gasoline declined by 8.6 per cent from 1981 to 1982, while sales of light fuel oil declined by 13.3 per cent. Refineries reduced production or closed. Company-operated and independent service stations changed prices frequently to maintain their share of a competitive market.

The rising Canadian cost for feedstock caused financial difficulties for Ontario's petrochemical industry. The Ministry of Industry and Trade and the Ministry of Energy presented Ontario's concerns in a brief to a federal ministerial task force. Among other measures, feedstock price relief for the Canadian industry was urged.

Natural gas

The Ministry of Energy represents the Government of Ontario's interests at proceedings before the National Energy Board each year.

During the NEB hearing on export of natural gas, the ministry testified that the domestic surplus is sufficiently large to accommodate additional exports without jeopardizing the long term adequacy of domestic supply. In its report of January 27, 1983, the NEB approved the export of an additional 0.3 trillion cubic metres (11.5 trillion cubic feet) of Canadian gas to U.S. and Japanese markets.

The Residential Energy Advisory Program saves money and creates jobs at the same time. Homeowners receive one-on-one advice about home energy efficiency from specially trained REAP advisers - drawn from workers whose unemployment insurance benefits have expired.

In February of 1982, the ministry participated in the National Energy Board hearing on the proposed Arctic Pilot Project. PetroCanada, Dome Petroleum, Melville Shipping Inc. and Nova, An Alberta Corporation plan to sell liquified natural gas principally to export markets in tanker loads from the Arctic. The hearing was adjourned when the project sponsors decided to look to European markets, rather than the U.S.

The government of Ontario, which has a 20 per cent interest in the Polar Gas Project through the Ontario Energy Corporation, supports that project to ensure Ontario's long-term supply of natural gas from the Arctic regions.

The ministry intervened at the NEB annual hearings concerning the tolls charged by TransCanada Pipelines to sell and transport gas from Alberta. The Ministry of Energy also presented evidence during the NEB's first rate hearing of the TransQuebec and Maritime Pipeline expressing concern that undue costs not be borne by Ontario natural gas consumers.

In September 1982, the Ontario Government established its Inflation Restraint Program which applies to public sector wages and prices as well as those determined by Ontario regulatory agencies. Since the natural gas distributors are regulated by the Ontario Energy Board, price increases in excess of Inflation Restraint Program guidelines can be reduced to comply with the legislation.

In February 1983, the Ontario Cabinet directed the Ontario Energy Board to hold a hearing into supply and pricing issues relating to purchases of western Canadian natural gas used as feedstock by Ontario ammonia producers. The hearing was scheduled to begin July 18, 1983.

The ministry initiated plans to update the survey of the furnace conversion marketplace it conducted in 1980, because of the new circumstances facing consumers considering converting from oil to natural gas.

A study of the cost of natural gas to Ontario industries competing in the North American market accumulated considerable comparative data on current U.S. industrial gas prices.

Uranium

As a result of recent cutbacks in nuclear generation programs, there is a surplus of uranium in the world and spot prices have been dropping. There is surplus mining capacity in Canada and production capacity must be adjusted to lower levels than expected. The ministry continues to work with the Ministry of Natural Resources and the federal government on security of supply, demand, pricing and further processing of uranium in Ontario.

Coal

Ontario, which has no coal of its own, uses about half the coal consumed in Canada. Ontario Hydro buys about 8 million tonnes (8.8 million short tons) of coal each year from the United States, and another 2 million tonnes (2.2 million short tons) from Western Canada. Ontario Hydro now has a surplus of coal resulting from reduced power demand. Steps have begun to reduce supplies in a cost effective manner. Further reductions in contracted supplies will be required in the future and negotiations are already underway. The Ministry of Energy is monitoring the supply situation.

Coal is also consumed by Ontario's steel industry and other industrial users such as small foundries and cement producers. The steel industry, which uses metallurgical coal to produce coke for blast furnace operations, accounts for 30 per cent of Ontario's coal consumption. The ministry is monitoring new developments which may lead to increased industrial uses for coal over the next decade.

Lignite

Ontario has large deposits of lignite in the James Bay Lowlands and there is an estimated 180 million tonnes (198 million short tons) in the Onakawana deposit. The ministry is currently assessing technologies for the

direct liquefaction of Onakawana lignite to produce a synthetic crude oil.

As part of the Alternative Transportation Fuels Program, the Ontario Energy Corporation is assessing technologies for the gasification of lignite to produce methanol. Researchers are seeking techniques that, if economic, could lead to the construction of a pilot plant and eventually to the building of a commercial-scale facility.

Peat

There are about 10 million hectares (24.7 million acres) of peatland in Ontario south of the permafrost line. In 1982-1983 the Ministry of Energy published the proceedings of the Peat Symposium, a highly successful international conference held in Thunder Bay in October 1981.

To assist potential entrepreneurs in the development of peat resources in Ontario, the ministry published *Peat Development*. It includes a list of agencies and programs which might offer financial assistance for the development of a peat industry including federal and Ontario incentive programs.

The ministry also published *Peat in Ontario: A New Awakening for an Old Fuel*, a smaller general summary on peat which identifies resource people and potential peat uses. In addition, the ministry published a peat market survey which will help determine the demand for peat as a substitute for coal and oil, primarily for use by northern Ontario industries. Once major industrial customers in peat-rich areas begin to use it, peat will be more economical to develop for use by nearby homeowners.

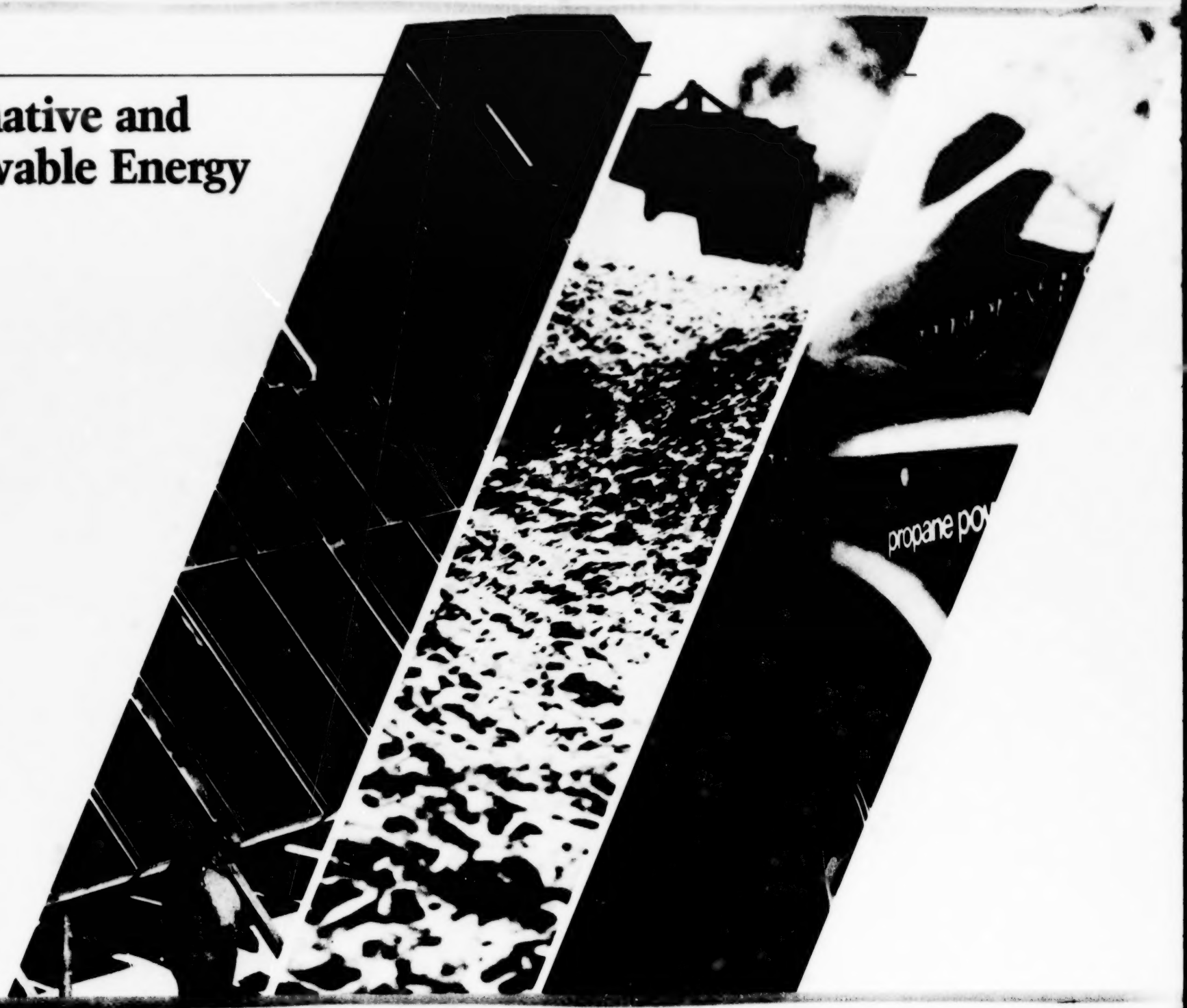
Conventional energy contingency planning

Members of the International Energy Agency (IEA) have entered into an oil-sharing agreement which would take effect in the event of an international energy supply disruption. As a member in that agreement, Canada is obligated to share its domestic supplies of oil with fellow members if the need arises.

In response to the federal program set up under the Energy Supplies Emergency Act 1979 the Ministry of Energy established an Energy Contingency Planning Program. This program will ensure that during any period of energy supply disruption, the province is prepared to support the federal program. In addition, the province will work with municipalities and the oil industry in coping with any future oil supply disruption. Interprovincial and federal liaison are crucial aspects of the program's activities as well as interministerial activity to prepare the government itself for such an occurrence.

Many of Ontario's small streams and rivers have considerable hydroelectric potential. Small hydro offers low-cost and almost inflation proof power. The Millcroft Inn in Alton has recently installed a 21 kW small hydro facility.

Alternative and Renewable Energy



Overview

The Ministry of Energy's Alternative and Renewable Energy Program, established in 1979, works with the private sector to investigate, develop and demonstrate a variety of energy systems based on renewable sources and new applications of conventional fuels.

Renewable energy is expected to play an ever growing role in Ontario's energy future. Renewable energy, primarily hydroelectric power, currently supplies almost 15 per cent of Ontario's total energy needs and by 1995, renewable energy could supply the energy equivalent of 20 million cubic metres (3.18 million barrels) of oil. Up to 40 per cent of this could come from wood industry residues, garbage and solar energy.

The ministry promotes the recovery of energy from municipal solid waste (garbage) and biomass (trees, crops and plant residues); solar energy; alternative transporation fuels such as propane, compressed natural gas, methanol and ethanol; water power; wind power; and hydrogen.

In the past year, the ministry undertook a technical and program assessment of its alternative and renewable energy programs to ensure that its efforts concentrate on areas where commercial breakthrough is probable.

Options suitable for market development in the short term include alternative transporation fuels, active solar hot water heating for businesses, and residential and institutional wood heating. The longer term options include solar energy for space heating, hydrogen and liquid fuels from biomass.

Energy from waste and biomass

Ontario produces millions of tonnes of garbage, wood industry residue and other forms of waste that can be coverted to energy.

The ministry helps the private sector and municipalities assess and develop energy from waste projects through the 15-year, $3 billion Energy from Waste (EFW) Program, introduced in 1980. In 1982-83 the energy from waste field in Ontario has moved from research and development to the installation of a number of systems.

By 1995, energy from muncipal solid waste (garbage) and biomass (trees, crops and plant residues) could supply up to four per cent of Ontario's energy requirements.

In early March, 1983 the ministry hosted ENERGO '83, an international conference and exhibition on energy from waste and biomass. About 450 people took advantage of this forum to exchange technical and economic information.

Municipal solid waste

Ontario residents throw out more than six million tonnes (6.6 million short tons) of garbage annually. Each tonne could yield the equivalent of a barrel of oil if burned. Using this waste to produce energy can help reduce municipal landfill requirements, as well as alleviate some associated environmental problems.

Using wood for energy

Wood residues — sawdust, bark and wood chips — currently supply almost one per cent of Ontario's total energy needs, primarily at pulp and paper plants. However, more than a million tonnes of residue is dumped or burned each year with no energy recovery.

Efforts are well underway to convert this waste to energy. Wood energy systems convert wood and wood residue to hot air, steam, electricity and "wood gas" — a gas that can replace natural gas for some industrial uses.

To help ensure these systems operate safely, the provincial and federal governments began to develop guidelines for the installation and inspection of residential wood heating systems.

Harvesting trees for energy

Researching ways to increase the energy content (heat value) of hybrid poplars through genetic breeding is

Opposite:
The Ministry of Energy's Alternative and Renewable Energy program promotes the development and demonstration of commercially viable technologies in solar energy, energy from waste, alternative transportation fuels and several other areas.

Grenville Christian College, a private high school near Brockville, has found its new wood heating system to be a cost effective alternative to oil heating.

funded by the Ministry of Energy and carried out by the Ministry of Natural Resources at the Ontario Tree Improvement and Forest Biomass Institute in Maple.

Rapidly maturing varieties of hybrid poplar can be harvested in as little as two to 10 years,. One hectare (2.5 acres) of land can produce more than 17 green tonnes (18.7 green short tons) of these trees annually.

Ontario's potential for extracting energy from wood is enormous. For example, eastern Ontario could produce more than one million dry tonnes (1,100,000 dry short tons) of wood and wood waste annually from industry at a maximum cost of $50 per dry tonne. Potential sources of this economical supply include logging operations, public and private woodlots, and hybrid poplar plantations. About 600,000 dry tonnes (660,000 dry short tons) of wood and wood waste are currently available each year in this price range. Future hybrid poplar plantations could provide about 400,000 dry tonnes (440,000 dry short tons) at about the same price.

About 130,000 dry tonnes (143,000 dry short tons) of wood per year could fuel a 9MW electricity and steam facility which would be cost-competitive with industrial electricity rates in the area. Information on fuelwood use and woodlot management in Ontario is available in *An Old Flame Rekindled: A Guide to Residential Wood Heating*, prepared by the Ministry of Energy and in *Fuelwood Consumption in Ontario*; and *The Woodburner's Manual — Managing the Woodlot for Profit* prepared by the Ministries of Natural Resources and Energy.

Energy and agriculture

The Ministries of Energy and Agriculture and Food are working to develop and demonstrate new energy saving technologies for the farm.

A five-year, $5 million incentive program to help the province's greenhouse industry to reduce costs by installing energy efficient technology began April 1, 1983. The Ministries of Agriculture and Food and Energy will provide grants of one third of the capital cost of an approved technology to a maximum of $4.25 per square metre of existing greenhouse space and $17,000 per enterprise.

The ministry continues to fund energy related research and development efforts at the University of Guelph and to support a wide variety of on-farm energy demonstration projects.

Solar energy

The ministry helped fund almost 40 active solar systems in both the private and public sectors in 1982-83. It also continued to encourage the housing industry to include passive solar design features in new energy efficient homes.

The ministry's solar program focuses on two areas: developing a solar industry in Ontario capable of manufacturing reliable, cost-competitive products and strengthening the markets for these solar products within the province. Solar energy is currently a $15 million a year industry in Ontario, employing about 400 people. About 80 per cent of all Canadian solar products are manufactured in Ontario. The export market continues to grow, with sales of more than $2 millon annually.

Active solar systems for outdoor swimming pools are now competitive with conventional pool heating systems. Passive solar features can reduce heating costs and can be included for little or no cost when designing a new home.

For certain commercial and industrial uses, the costs of some active solar systems are competitive with conventional fuels over the expected 20 year life of a solar energy system. However, a solar system's capital costs are incurred in the first year. Consequently, the ministry is also investigating a number of financing options which recognize the burden of this initial expenditure.

The ministry contributed about $1.3 million in 1982-83 to help fund 12 solar systems and monitor existing solar projects in the public sector.

Solar energy projects were also funded this past year through Phase II of the five-year, $10 million Commercial/Industrial Solar Demonstration Program, introduced by the Ministry of Energy in 1981. Phase II was co-sponsored by the federal government through the Conservation and Renewable Energy Demonstration Agreement (CREDA).

Twenty-seven businesses, municipalities and non-profit groups received a total of $2 million, or up to 85 per cent of their total costs, for installing solar energy systems.

In total, the Phase II projects represent 5,000 square metres (53,821 square feet) of collectors. They create business for 10 Canadian solar companies.

The ministry received 99 proposals worth more than $6.4 million for this second year of the commercial/industrial program. These proposals were 50 per cent more cost effective than those of the previous year. This demonstrates that Ontario-made solar products are competitive in the world market.

Photovoltaic systems

Photovoltaic systems convert the sun's energy directly to electricity. They are already cost competitive with conventional forms of energy in remote areas where supplies of oil must be flown in to operate diesel generators to produce electricity.

In the past eight years, the cost of photovoltaic systems has dropped ten fold, and further cost reduction is expected. To promote photovoltaics, the ministry completed the report *Photovoltaic Technology, Industry and Market Development Opportunities* this year.

Passive solar homes

As part of the ministry's $550,000 Low Energy/Passive Solar Housing Demonstration Program, passive solar design features are being incorporated in the design of energy efficient homes.

The Ministry of Energy is helping to finance the construction of 35 homes that could be heated for up to 80 per cent less than the cost of heating conventional housing.

The project is managed by the Housing and Urban Development Association of Canada (HUDAC). The sites are in Barrhaven (near Ottawa), Brampton and Freelton (near Guelph).

Twelve of the homes were completed by March 31, 1983. The energy consumption of these homes will be monitored for two years.

Alternative transportation fuels

To help reduce oil consumption in the transportation sector, the ministry encourages the development of such substitutes as propane, compressed natural gas, methanol, ethanol, electricity and hydrogen through its five-year, $75-million Alternative Transportation Fuels Program, announced in 1980.

Propane

By the end of 1983, there were approximately 22,000 propane-powered vehicles in Ontario and the number continues to grow. Most of the propane-powered vehicles in Ontario have been converted from gasoline power. Investigation of the benefits of conversion from diesel to propane is also underway. In the past year, the ministry reached an agreement with the Ministry of Transportation and Communications, the federal government and Ottawa Carleton Transpo Ltd. to convert 15 diesel fuelled buses to propane in the next fiscal year.

Compressed natural gas (CNG)

Consumers' Gas System of Toronto is the first company in Canada to demonstrate the use of compressed natural gas (CNG) in a full scale commercial fleet. In 1982-83, the Ministry of Energy and the federal government contributed $142,000 of the $380,000 cost of this project, in which 22 vans were converted to CNG. It is expected that over a period of one year, the vans will displace about 109,000 litres (24,000 gallons) of gasoline.

The vans will be monitored for two years. As part of the project, Consumers' Gas installed a 45 horsepower

Ontario residents throw out more than 6 million tonnes (6.6 short tons) of garbage each year – the energy equivalent of 0.6 million barrels (95,400 cubic metres) of oil. Energy recovery from waste not only yields a valuable energy source, but also reduces municipal landfill requirements.

Rapid growing hybrid popular trees can be harvested in as little as two years. The Ministry of Energy funds research programs to increase the heat yield of these poplars.

natural gas compressor with both slow and quick fill refuelling facilities at its Eastern Avenue depot in Toronto. The quick fill facility will be available to other fleet owners who convert to CNG. A marketing survey will identify other commercial fleets which are potential users of the technology.

Alcohol fuels – methanol and ethanol
Research and development of alcohol fuels in Ontario continue to be supported by the Ministry of Energy.

At present, the alcohol fuels methanol and ethanol are blended with gasoline in the United States, Western Europe and Brazil. In Brazil, cars that run solely on ethanol are also common. A number of test cars are fuelled solely by methanol in California.

Methanol is usually produced from natural gas, the most economical source, but can also be produced from coal, lignite, wood and peat. Ethanol is commonly manufactured from grain, sugar or starch, but can also be made from wood. At present, methanol appears to have the greatest future in Ontario because it is less expensive to produce.

The ministry is preparing a demonstration program with the Ministry of Transportation and Communications, the federal government, the Ford Motor Company and Shell Canada to test 16 vehicles fuelled by neat methanol (a methanol and gasoline blend that is more than 90 per cent methanol). The test will take place in the 1983-84 fiscal year.

Electric vehicles
The government's Electric Vehicle Task Force Study funded by the Ministry of Energy outlines the potential cars and vans in Ontario to be powered by electricity. The ministry also signed a $155,000 contract with Ontario Hydro this past year to monitor and assess the cost effectiveness and road performance of its 12 electrically powered cars.

Hydrogen
Hydrogen could become Ontario's main transportation fuel in the next century. In the interim, hydrogen will plan an increasing role as an industrial chemical in the energy and chemical products sector.

The Institute for Hydrogen Systems, a research facility of the University of Toronto, opened in February 1983. The Institute will receive $10 million over five years from the Ministry of Energy to develop the commercial potential of hydrogen and investigate the technical, environmental and safety matters related to its use.

One of its projects is to develop fuel cells and fuel storage systems for use in the transportation sector.

Remote power

Forty-three communities in remote parts of northern Ontario are not connected to the Ontario Hydro power grid. To help reduce energy costs in these remote communities, the ministry continues to test wind, water, solar and wood systems. The ministry completed two studies this past year to identify the potential of renewable energy in remote communities. The *Remote Community Data Base Study* outlines the energy demand and renewable energy resources in each of Ontario's remote communities. The *Assessment of the Barriers to Alternative Remote Power Systems* identifies potential obstacles to implementation.

Water power
The Ministry of Energy helped fund two micro hydro projects in Ontario in 1982-83.

Wind power
The ministry continued to test a wind-diesel generator which was installed near Sudbury in 1981. In this hybrid system, a wind turbine is coupled directly to a diesel generator to produce electricity.

Ministry-funded testing of a 10 kW wind turbine at the Atlantic Wind Test Site on Prince Edward Island ended this past year. The system, manufactured in Ontario, will be moved to the Kortright Centre for Conservation.

Ministry of Energy Alternative and Renewable Energy Projects

Project	Application
Energy from waste (EFW)	
Victoria Hospital, London Municipal solid waste (MSW)	Energy from waste facility to burn 270 tonnes (297.5 short tons) of garbage/160 tonnes (176 short tons) of sewage sludge to provide steam for all hospital's water heating needs, most space heating requirements and one third of its electric power.
Lakeview Water Pollution Control Plant – Peel Regional MSW	First Ontario installation to use a fluidized bed incinerator at a sewage disposal plant. Steam produced will save more than half a million dollars in fuel costs annually. This is a federal/provincial project, to which the ministry contributed $175,000.
Tricil/SWARU, Hamilton – Environmental testing of solid waste and reduction unit	Operations were reduced by 20 per cent due to concerns about dioxin emissions. Further testing of emissions and equipment continues.
Research into possible EFW sites across Ontario	The ministry helped finance studies and proposals to build EFW facilities in North Bay, Ottawa, Sudbury, the Region of Waterloo and Kent County.
Long term strategy development – MSW	Commissioned Price Waterhouse Associates and Peat Marwick and Partners to develop long term strategies for EFW/MSW projects.
Energy from landfill sites	
Bestpipe Ltd., Kitchener	Methane gas from a landfill site is pumped across the street to Bestpipe where it fuels a boiler. Studies show this site could produce gas to displace more than 0.8 million cubic metres (28.3 million cubic feet) of natural gas annually for the next 15 years. In 1982-83 the ministry contributed $40,000.
Beare Road landfill, Scarborough	The ministry helped fund a Metropolitan Toronto study which concluded that methane gas from the Beare Road landfill could heat a proposed conservatory green house complex.

In the past, potentially valuable waste was usually left behind on the forest floor after an area was logged. Now, wood residues are converted into a viable source of heat energy.

Mohawk Hospital Services in Hamilton, which provides laundry services for six hospitals, uses Canada's largest active solar energy system to heat its laundry water. The system is expected to save up to $40,000 during the first year of operation.

Project	Application
Energy from wood	
Grenville Christian College, Brockville	First institution with fully automated wood heating system. Combined with other ongoing energy related modifications, the system, which burns sawdust, wood chips and bark from nearby sawmills, helped reduce heating costs by $25,000 in 1982-83.
Hillcrest High School, Thunder Bay	Completed a feasibility study that supports the installation of a wood energy system similar to the Grenville Christian College system. The system will be partly funded by the ministry.
Ryerson Polytechnical Institute, Toronto	Contributed $318,000 to establish a wood energy laboratory at Ryerson to test safer, more energy efficient residential wood heating equipment.
Investigations	Continued to investigate the feasibility of installing wood energy systems at Thunder Bay's Lakehead University, Kingsway College in Oshawa, and the Kemptville Agricultural College. The ministry, with the federal government, continues to develop guidelines for the installation and inspection of residential wood heating systems.
Research into Hybrid Poplar Heat Value	The ministry contributed $25,000 in 1982-83 to research ways to increase the heat value of hybrid poplars through genetic breeding. Work is carried out by the Ministry of Natural Resources.
Petro Sun Inc., Mississauga	Awarded $490,000 to design, manufacture, install and monitor a wood gasifier that will supply all electricity to the 190 residents of the small logging community of Ramsey, northwest of Sudbury. The gasifier is coupled with a 350 kW diesel engine generator.
Energy and Agriculture	
Lafleur Gardens Greenhouses, Timmins	The ministry contributed $57,000 to install a refurbished turn of the century steam engine fired by wood chips and sawdust which will produce electricity for heat and light.

Project	Application
Foothill Greenhouses Ltd., Kettleby	Contributed $78,000 towards a new $203,000 wood burning heating system that uses sawdust from local furniture manufacturers and saves an estimated $40,000 a year.
New greenhouses at the Vineland Station Horticulture Research Institute of Ontario	The ministry provided $625,000 towards the construction of energy efficient greenhouses designed to show Ontario growers how to improve their operations.
Lander Control Systems, Orangeville	The ministry provided $72,500 to help further improve and lower the cost of Lander's recently developed computerized greenhouse environmental control system.
Selves Farm, Fullerton	The ministry provided $141,000 towards an engine driven generator fuelled by methane from the manure of 1,300 hogs. It produces all the farm's electricity. As well, through another process, protein is extracted and used to provide a special diet for the hogs.
Bauman Farm, Elmira	The ministry contributed $3,000 towards a heat pump that extracts heat from the cow barn and moves it to the farmhouse.
Glanworth and Guelph dairy projects	Dairy farms in Glanworth and Guelph were awarded $13,600 to test a new system that uses the heat produced when fresh milk is cooled. Using a heat exchanger, the excess heat is rechanneled to preheat water used for washing cows, disinfecting milking equipment, and warming the milkhouse.
Dave Smith Farm, Port Ryerse	The ministry contributed $3,500 towards the design and construction of an automatic-feed Dutch oven that burns farm waste to fire a 60 horsepower restored locomotive boiler that dries grain.
Solar Energy	
Mohawk Hospital Services, Hamilton	Canada's largest active solar system heats more than half a million litres (110,000 gallons) of water daily. The 2,011 square meters (21,719 square feet) of solar collectors are mounted on the ground beside the building and are expected to save up to $40,000 in energy costs the first year alone.

Methane gas, which can be collected from farm manure, is a versatile energy source.

Propane is gaining popularity as an economic alternative to gasoline, particularly for fleet vehicles such as taxis and delivery vans.

The ministry supports the research and development of alcohol fuels – methanol and ethanol. Methanol, usually produced from natural gas, is also made from other fossil fuels and wood.

Project	Application
Ontario Provincial Parks	The ministry funded solar energy systems that heat the water for showers and laundry facilities at seven provincial parks.
Guelph Correctional Centre	This Ontario government building uses a solar water heating system that supplies more than 10 per cent of the centre's hot water heating needs.
Province-wide non-profit housing projects	Solar systems now operate at non-profit senior citizens' apartments in Sarsfield and Sheffield, and installation has begun at similar apartments in Petawawa and Walkerton. The ministry contributed funds to cover up to 90 per cent of the installation.
Canada/Ontario Commercial/Industrial Solar Demonstration	The ministry and Energy, Mines and Resources Canada each provided $1 million towards the installation of 27 solar energy systems in the commercial, industrial and non-profit sectors. The systems installed in 1982-83 were 50% more cost effective than those installed the previous year.
Alternative Transportation Fuels	
Ontario Energy Corporation	The ministry awarded OEC $2.8 million to study the potential use of methanol in Ontario. Work includes a methanol-gasoline blend vehicle demonstration; investigations of regulatory, safety and environmental issues; and assessing a market strategy and the feasibility of methane production from Ontario based resources.
Pilot ethanol plant, Downsview	The ministry and the federal government contributed $600,000 towards a $4.9 million pilot plant designed to develop new technologies to convert wood to ethanol.
Methanol Blend demonstration	Vehicle performance and fuel efficiency tests of private sector vehicles fuelled by two different methanol blends were funded by the ministry in preparation for the commercialization of methanol blends.

Project	Application
Electric Vehicles	
Ontario Hydro vehicle study	The ministry signed a $155,000 contract with Ontario Hydro to study the economics and performance of its 12 electrically powered cars.
Water Power	
Dorion Fish Culture Station, Lake Superior	The ministry funded the $82,000 small scale water power system that diverts Wolfe River water to a turbine which turns the new 14.5 kW hydroelectric generator. It supplies all the electricity, and saves some $2,800 a year in hydro costs. The surplus is sold to Ontario Hydro.
The Millcroft Inn, Alton	The ministry contributed $65,000 towards this $80,000 small scale 24 kW water power system that supplies the Millcroft Inn with all its electricity. Surplus is sold to Ontario Hydro.
Guelph Dam, Speed River	The ministry continues to monitor the 80 kW small scale water project on the Speed River which demonstrates the economics of installing a micro hydro unit into an existing dam.
Sandy Falls	The ministry contributed $25,000 towards the $77,000 installation of a stainless steel, highly efficient, water wheel at the Sandy Falls Ontario Hydro site, north of Timmins. It can generate 50 kW of power.

Alternatives to costly diesel powered generators are being tested for use in remote northern communities. This hybrid wind diesel system takes advantage of inexpensive wind power when wind speeds are sufficiently high and consumes diesel fuel at other times.

The Canada/Ontario Conservation and Renewable Energy Demonstration Program

Participants in the Canada/Ontario Conservation and Renewable Energy Demonstration Program inform potential investors and buyers about new energy systems and new applications.

Technology transfer

Demonstrating new energy technologies or techniques in practical settings is a key ingredient in developing their acceptance in the marketplace. This five-year, jointly funded $58 million program was created by the federal and Ontario governments in 1979 to share the direct costs and a reasonable portion of the indirect costs of project development, demonstration and promotion.

To date, joint funding in excess of $20 million has been committed for 60 energy demonstration projects. The private sector has contributed a further $20 million. It is estimated that over a five year period, these projects will displace or save the equivalent of 160,000 cubic metres (35 million gallons) of oil.

This program informs buyers and investors about new energy systems and new applications. Participating equipment suppliers and site owners are normally required to produce and carry out information transfer activities, such as audio visual presentations, trade journal articles, conference and seminar presentations, site visits and technical reports. These activities are directed at specific target markets showing the greatest potential for future use of the technology.

1982-83 projects

Examples of information transfer activities that occurred during 1982-83 include: the official opening of the time of use meter adapter demonstration in Port Colborne Ontario; the production of the French version of the film 'Old House, New House'; the program exhibit at the Industrial Energy Exposition in Toronto; and the official commissioning of a fuel gas heat recovery system at a farm implements manufacturing plant in Welland.

The ministry's role in the information transfer process is to offer advice to program participants about establishing the new product in the marketplace. Information resources co-ordinated by staff include project summary sheets, a computer library of all energy projects, and the distribution of technical reports.

The project summary sheets provide a concise synopsis of each with a system description, an economic analysis, and contact information. Each is prepared and distributed by the provincial energy ministry involved.

The computer library of data on all Bilateral energy demonstration projects is a comprehensive collection of key-word indexed project abstracts.

Each Ontario participant is required to submit a final technical report to the ministry. The ministry is developing the most effective way to distribute these detailed reports to their target audience, and will also make them available on request.

During 1982-83 the ministry participated in an information tabloid developed by Energy, Mines and Resources Canada, in cooperation with *Renewable Energy News*. There were 10 Ontario projects featured, ranging from glass plant heat recovery to a low energy ice generating machine.

The Bilateral program is an example of government and the private sector successfully working together to develop and promote new conservation and renewable technologies.

Energy Conservation

Community energy management

Municipal operations

Programs administered by the Ministry of Energy help municipalities accelerate their energy conservation efforts by providing them with funding and technical assistance.

The City of Mississauga saved in excess of $700,000 between 1979 and 1982, and its city hall used almost 60 per cent less energy and 78 per cent less water during the same period.

The City of Nepean has reduced overall energy consumption by 18 per cent and in the past two years, the Nepean Sportsplex has consumed between 35 and 40 per cent less energy.

The Ontario Municipal energy audit program

Forty-three energy audtors have been appointed under this program since its inauguration in 1981. They are running energy management programs in 286 municipalities, with salary dollars provided by the ministry. The program is administered in conjunction with the Ministry of Municipal Affairs and Housing.

Municipal Oil Conversion and Energy Conservation program

By the end of 1982-83, approximately $1.25 million was spent on 250 projects. These projects displaced 13 million litres (2.9 million gallons) of oil and saved $1.1 million in annual energy costs.

This program shares the cost of converting municipal heating systems from oil to alternative energy sources and of retrofitting existing municipal buildings.

The program also provides the needed technical advice and training to develop local energy management expertise. Since its inception in 1981, more than 550 applications have been received from 195 municipalities.

Community Energy Management Demonstration program (CEMD)

In 1982, Burlington, Brampton, Stratford and Ottawa received funds to prepare long term community energy strategies. These will set the direction for future energy conservation projects and help determine cost effective ways of improving energy efficiency.

Burlington completed its draft community energy management plan, aided by an active citizens' energy action committe. Ottawa's energy advisory committee released *"Towards an Energy Action Plan for the Residential Sector."*

Brampton completed an in-depth analysis of energy supply and demand that will serve as a basis for identifying areas of high energy consumption. Several Stratford citizens' committees are developing energy strategies in transportation, recycling, tourism and communications.

Energy Conservation through Land Use Planning grants program

This program has been successful in showing municipalities how energy consumption can be reduced through careful land use planning. To date, 18 municipalities have received grants, including Ottawa, Windsor, Welland, Richmond Hill and Guelph.

Lebreton Flats project

1982-83 was the first year of operation for the district heating system in 200 townhouses and apartment units at the Lebreton Flats housing project in Ottawa. Hot water is piped to each house, where heat is then extracted and distributed in a forced air system.

In May, a national seminar on the Lebreton system attracted representatives from the engineering profession, provincial energy ministries, and industry in Canada and the United States.

Opposite:
It costs less to save energy than to extract it from traditional sources. Using energy wisely at home and at work makes good economic sense. The Ministry of Energy promotes energy conservation in the three major energy-consuming sectors - industrial, transportation and residential.

At Lebreton Flats, Ottawa's first district heating facility, hot water is piped to 200 housing units. Heat is extracted from the water and carried to homes through a forced air system.

Hamilton redevelopment project
The Ministry of Energy sponsored a competition to solicit development proposals which demonstrate how attractive, energy conserving, affordable family housing can be designed to blend into a mature urban neighbourhood.

Sunshine Homes of Hamilton was selected from five submissions by a panel of experienced architects and planners representing both government and private industry, and awarded the first prize of $10,000. Construction will begin in the summer of 1984.

Planners Energy Handbook
The ministry has completed a series of reports that deal with new techniques for conserving energy through land use planning, and future research is planned.

Demonstraton of community-based action
Municipalities, aided financially and technically by the ministry, have initiated community-oriented energy programs.

The Peel Urban Energy Centre, located in the Enercon Building on the Sheridan College Campus in Brampton, is developing specialized energy management courses for industries, businesses and the public in the regions of Peel and Halton. In cooperation with Brampton Hydro, the centre is now offering 'house warming parties', adapted from Toronto's ECCO project.

The Toronto Energy Conservation Community Outreach Project (ECCO), is a City of Toronto/Ministry of Energy project that provides expert advice on energy conservation to homeowners and builders. Building inspectors and other trained staff inform homeowners about available grants, retrofitting techniques, renovation ideas and oil substitution. 'House warming parties' provide in-home energy conservation demonstrations and are a popular ECCO service.

The program was successfully pioneered in the Riverdale area of Toronto, where some 4,000 people were assisted during 1982-83.

Energy education

Now six years old, the energy education program is a cooperative effort of the Ministries of Energy and Education and the Ontario Teachers' Federation to help Ontario students and teachers understand and appreciate energy's importance in society.

Professional development
During the past four years, summer energy seminars provided teachers with energy information, teaching aides and assistance in developing new teaching approaches and materials. These seminars have evolved into an annual conference, the first of which, held in February 1983, was attended by 150 teachers.

In 1982-83 the Ministries of Energy and Education ran 43 workshops to familiarize 700 teachers with primary and junior level curriculum documents and resource materials on energy.

Curriculum development
The Ministry of Education, with funding and technical assistance from the Ministry of Energy, continued work on *Energy in Society II*, an energy curriculum resource guide for secondary school teachers which will be published in the fall of 1983.

Eight booklets are available in the *Curriculum Ideas for Teachers* series for primary and junior teachers. Four are in French. Four additional junior booklets are planned for 1983.

Teaching aids
The Ministry of Energy distributed a set of colourful energy posters. Plans were made this year for two more posters plus a teachers' guide. The ministry also provided teachers and students with data and resource materials on a wide variety of energy related topics.

Outreach activities
The Ministry of Energy continued to assist Energy Educators of Ontario (EEO), a non-profit corporation

funded by government and the private sector.

This volunteer network of 620 teachers provides information on energy education; promotes energy as a subject in the Ontario curriculum; and publishes a membership newsletter and a newspaper called *Energy Alert* as well as a series of teacher starter kits.

Transportation energy management

Transportation, which accounts for half of the oil consumption in Ontario, is vital to the province's industrial based economy.

Government and the private sector are working hard to help vehicle owners, commercial fleet operators and municipal fleet managers and transportation planners reduce energy consumption.

The Transportation Energy Management Program (TEMP), a joint Ministry of Energy – Ministry of Transportation and Communications program, aims to improve the energy efficiency of transportation technology and operations.

Ridesharing

TEMP actively encourages employers to form van pools. To date, 16 companies have sponsored 114 van pools, (with six more soon starting up) representing a saving of almost 2 million litres (440,000 gallons) of fuel annually.

Teleconferencing

Another TEMP program, teleconferencing, encourages people to substitute telephone conferences for travel. Teleconferences have become a standard practice for many Ontario ministries.

Drivesave

DriveSave, the TEMP program aimed at light vehicles, continued to deliver information seminars for fleet operators and high school driver trainers. In addition, pamphlets giving seasonal driving tips were mailed with driver's licence renewals.

The 'Drivesave Zone', a film to teach high school students the importance of fuel efficient driving, has been distributed to all schools that offer driver education courses.

Trucksave

With the cooperation of the Ontario Trucking Association and private industry, Trucksave promotes truck fleet fuel efficiency through information on idling, engine temperature controls, specifying truck features and maintenance practices.

The Fuel Economy Challenge '82 was so successful that another one is planned for 1983. A total of 62 fleet drivers and owners/operators participated in a fuel efficiency contest to see who could haul the heaviest load for the least amount of fuel.

Drive Propane

Drive Propane informs commercial car and truck fleet owners of the advantages of using propane instead of gasoline. It is accompanied by a range of Ontario government tax incentives for alternative fuels.

As a result of Drive Propane there are some 22,000 propane-powered vehicles on Ontario roads today. Its goal is 40,000 propane-converted vehicles by 1985.

The Ontario government also has a propane conversion program for its own fleet. The program goal is to have 2,000 government vehicles on propane by 1987, where the conversion is cost effective. To date, the government operates 699 vehicles and 44 refuelling stations.

For six years the ministry has, in cooperation with the Ministry of Education and the Ontario Teachers' Federation, helped Ontario teachers and students understand the importance of energy issues, particularly conservation. Students in Renfrew County watch one alternative energy form in action at a local exhibit.

Municipal and intercity transporation

This year the Regional Municipality of Hamilton-Wentworth and the City of Hamilton have implemented many of the recommendations of a TEMP study on energy conservation options in traffic management. The retiming of computer controlled traffic signals was one key move.

A demonstration of computer controlled traffic signals was completed in the Regional Municipalities of Durham and Waterloo and the City of Brantford.

Safety and regulations

The sale of natural gas as a motor vehicle fuel was exempted from price regulation. It is now competitive with gasoline and propane and is commercially available.

The ministry is helping fund the Canadian Gas Research Institute's development of an economical system that accurately measures the amount of compressed natural gas (CNG) delivered from a high pressure storage system to the high pressure tanks on board the vehicles.

As well, the ministry has begun development of a *Guide to Siting Propane Fuelling Facilities in Ontario* for use by the province's municipalities and the propane industry.

Conservation in industry

Ontario's industries use about 10 per cent of all the crude oil consumed in the province and 40 per cent of Ontario's secondary energy, which includes electricity, heating oil and gasoline and steam.

Industrial Energy Management Program

To help industry use energy more efficiently, the Industrial Energy Mangement Program was created three years ago. The Ministry of Energy provides funds and policy guidance, while the Ministry of Industry and Trade's Energy Group administers the program.

The program encourages industry to adopt energy management plans, provides incentives for industry to substitute indigenous electricity, coal and natural gas for oil, and promotes energy efficient plant equipment and facilities.

Industrial Energy Conservation and Oil Substitution Incentive Program

The three-year, $10 million Industrial Energy Conservation and Oil Substitution Incentive Program was completed this year. It provided manufacturers with grants of up to $50,000 to either fit plants with energy efficient equipment or to convert their heating systems from oil to more plentiful domestic energy sources.

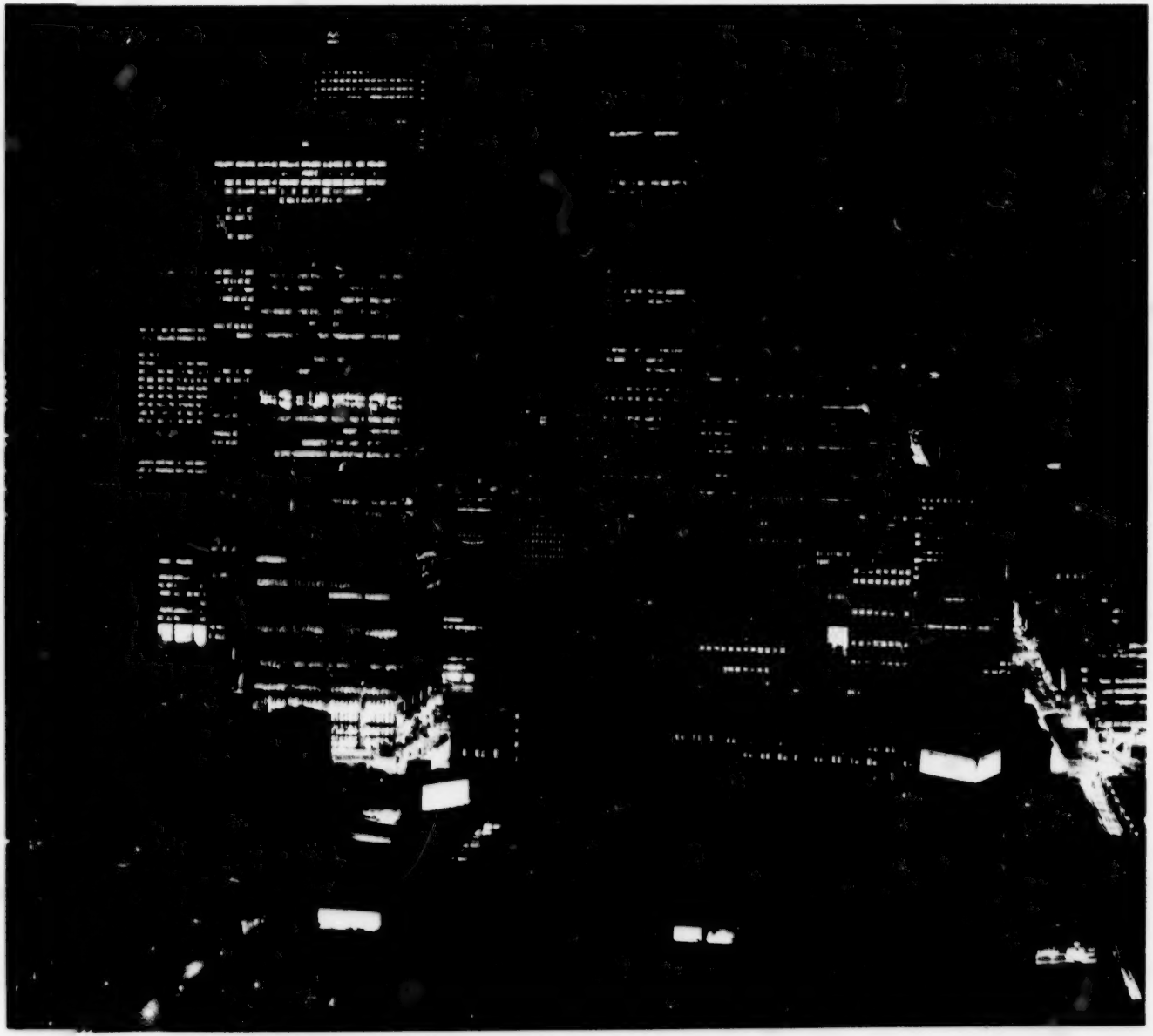
Twelve hundred companies have invested $45 million in energy efficient equipment supported by $10 million worth of Ontario incentives.

The oil conversion projects approved during the program will save more than 95 million litres (21 million gallons) of heating oil for Ontario. The energy conservation measures that were undertaken have saved the equivalent of 83 million litres of oil (18.3 million gallons) – worth a total of $20 million — enough energy to heat 24,556 homes for one heating season.

The energy bus

For six years now, the provincial Energy Bus program has been helping industry and commercial enterprises identify and quantify energy saving measures. Operated by the Ministry of Industry and Trade, the program sends out technicians that analyze individual company energy consumption patterns, and point out in-plant energy saving opportunities.

To date, the Energy Bus has visited 1,748 companies and identified more than $57 million in potential energy savings — an average possible saving of $21,000 for each company visited.



Most office buildings in use today were designed at a time when energy was cheap and in ample supply. The ministry provides technical assistance to building owners so they can save money through more efficient energy consumption.

Absorption liquid chillers in the London Court House air conditioning system consumed large amounts of energy before the ministry's energy conservation program for government buidings got underway. By reducing the operating time of heating and cooling equipment and implementing other conservation measures, the court house cut back energy consumption by 75 per cent.

Industry initiatives

During the past few years, there have been several Ontario industries that voluntarily adopted energy conservation programs. Noteworthy energy savings are shown by some of the companies that belong to the Canadian Energy Conservation Task Force.

Overall, member companies achieved a 16.3 per cent improvement in energy efficiency compared to their base year. The industrial sector is now saving enough energy each year — through more efficient use of equipment, retrofits, and favourable product mix changes — to heat 3.75 million Ontario homes.

Industrial energy saving technology demonstrations

Under the Canada/Ontario agreement more than $980,000 has been allocated to industrial energy conservation projects worth more than $28 million.

One project demonstrates a way to make ice for the fishing industry at half the regular cost. Henry H. Misner Ltd. of Port Dover, received a contribution of $170,350 towards this new system.

I.G.P. Ogilvie in Thunder Bay received a contribution of $500,000 to demonstrate anaerobic production of biogas from mill waste. This system is expected to replace 25 per cent of the natural gas consumed annually in the plant's boiler and dryers, saving $160,000 a year in energy costs.

To demonstrate the feasibility of the reverse osmosis technique as an energy saving method of reducing the water content in maple syrup, the Memteck Corporation received a contribution of $100,000. This is expected to reduce fuel oil consumption by up to 75 per cent in 10 Ontario maple syrup operations.

Cogeneration

Cogeneration is the simultaneous production of useful heat and electricity from a single energy source; for example steam and electricity from gas or oil.

An industry with large steam requirements can produce electricity through cogeneration to make best use of its fuel. Similarily, a utility producing electricity can produce steam or useful hot water to increase the overall efficiency of the generating station.

In 1982, the University of Ottawa installed a cogeneration system, with the help of a $158,000 incentive from the ministry. It consists of a one megawatt, steam powered turbine and electrical generator combination, and is connected to the university's natural gas-fired boiler. The generator produces 10 per cent of the university's electrical energy needs, while the exhaust steam from the turbine is used to help heat the campus.

Ministry studies show that up to 5750 MW of electrial power are technologically available through cogeneration in Ontario. The Ministry of Energy, with Ontario Hydro and the Ontario Energy Corporation, has contributed to an analysis of major potential cogeneration opportunities. Ten promising candidates were selected for site specific cogeneration engineering studies. This information will be used by the ministry to develop a cogeneration policy for the future.

Conservation begins at home

Heat Save program

The average homeowner can save up to 25 per cent on heating bills by insulating, lowering thermostat setting, adding or improving storm windows and doors and by caulking and weatherstripping.

The ministry's Heat Save Program shows homeowners aerial thermograms which pinpoint areas of heat loss that may be due to insulation problems. Staff also discuss with the homeowner the cost, practicality and payback periods of options for improving the energy efficiency of his/her home.

During 1982-83 Heat Save clinics were held in 14 cities and towns including Ottawa and parts of Ottawa's surrounding area.

Since 1980, more than 87,000 homeowners across the province have benefitted from this personal energy saving service.

Conservation in government

Government and public buildings

In 1976, the Ontario government set out to reduce energy consumption in government-owned buildings by 15 per cent over a five-year period. By the third year, this goal was already surpassed, and by the fifth year government buildings were using 25 per cent less energy – a cumulative saving of more than $27 million on an investment of about $12 million.

In 1980, $10.6 million was allocated to reduce energy use by a further 7.5 per cent by 1986. During 1982-83, about $4.8 million was spent on futher energy conservation measures and by March 31, 1983 energy use had been reduced by another six per cent.

Oil substitution program for government buildings

In 1980, the Ontario government began the $2.5 million, five-year program to convert oil heating equipment to cheaper, more plentiful fuels. The target was to convert 338 buildings in order to save 20 million litres (4.4 million gallons) of oil a year.

The program accelerated, converting 90 buildings in 1982-83. By March 31, 1983, a total of 274 buildings were converted to natural gas at a cost of $1.4 million. These conversions will save about 13 million litres (2.9 million gallons) of oil – which, because natural gas is much cheaper than oil, translates into enough money to pay back the cost of conversion in approximately one year.

Conservation and Off-Oil Conversion Program for public institutions

The $12 million Conservation and Off-Oil Conversion Program for public institutions is a three-year program which began in 1981. It helps fund off-oil conversions and conservation measures in municipal buildings and government-funded facilities.

The target of saving 60 million litres (13.2 million gallons) of oil in government-funded facilities has already been surpassed. During 1982-83 more than 280

More than 87,000 Ontario homeowners have been shown how to "keep the heat in" since the Heat Save program began in 1980. Direct, personal advice helps people choose cost effective home conservation alternatives.

Premier William Davis launched Ontario's BEST - Big Energy Saving Team - in June, 1982. About 80,000 Ontario government employees are being encouraged to use energy efficiently both at work and at home.

oil conversion projects were completed involving schools, colleges, universities, hospitals and other institutions - saving more than 26 million litres (5.7 million gallons) of oil per year.

Ontario's BEST

Ontario's BEST, the Ontario government's employee energy saving program, was launched by Premier William Davis in June 1982. BEST stands for Big Energy Saving Team. Co-ordinated by the Ministry of Energy, the program involves some 80,000 employees in all government ministries.

The BEST program is aimed at helping these employees use energy more efficiently at work and at home - setting an example of wise energy use for all Ontario citizens.

In the spring of 1983 Energy Conservation Awards for government buildings were given to recognize energy savings achieved in 101 government buildings and by 42 individuals. All of the recipients met or surpassed the program's five-year, 15 per cent energy savings target.

Energy efficient building technology

The Ministry of Energy is developing cost effective conservation techniques for widespread applications in residential, commercial and industrial buildings both independently, and with other ministries.

This work involves examining a building's shell, its construction and any renovation, as well as its heating, ventilation, cooling and lighting systems and office equipment.

Team effort a commercial success in two cities

Owners and tenants of office complexes in Toronto and Ottawa report major energy savings - amounting to more than $5 million annually - thanks in part to the Ministry of Energy's Downtown Buildings Energy Conservation Program.

The program works through the volunteer participation of 51 firms, representing 3 million square metres (32 million square feet) of office space in 114 buildings.

The average energy saving is reported to be 22.5 per cent - or more than $20 million over five years.

The ministry sponsors Downtown Energy Forums annually in both cities. To date, there have been 40 workshops and forums. Other cities throughout Canada look to the ministry's Downtown program as a model for energy projects that serve business and governments well.

Energy conservation in religious buildings

The people responsible for operating Ontario's more than 10,000 religious buildings have to make the best long and short term use of the congregation's funds.

In recent years, many have implemented energy conservation measures, assisted by a ministry program to deal with the special architectural and financial considerations associated with religious structures.

More than 200 congregations have appointed energy coordinators, and a further 600 have expressed keen interest in the program. So far, 65 energy forums, workshops and other meetings have been held throughout the province.

Developing high efficiency boilers

In 1982-83 the ministry continued to support the Canadian Gas Research Institute's development of commercial/industrial high efficiency, gas fired hot water boilers.

While conventional boilers operate at thermal efficiencies ranging from 50 to 70 per cent, a new prototype version extracts maximum heat from the burned gases before discharge - achieving thermal efficiencies of between 88 and 93 per cent.

Extensive field tests of the commercial and industrial versions were started in 1983. The boilers are ideally suited for high rises, schools and hospitals and they are expected to reach the marketplace in the next few years.

Water source heat pumps

Water source heat pumps extract heat energy from lake water or well water. They are highly efficient year round compared to air-to-air pumps which are adversely affected by cold weather.

During 1982-83, a two-year demonstration project was launched at Queen's Quay in Toronto, in which Lake Ontario water will be used to heat and cool a Lakeshore commercial establishment.

Another project in the City of Valley East demonstrates a heat pump using aquifers as the water source. The heat pump supplies the heating and cooling needs of a 3300 square metres (35,520 square feet) recreational complex.

Building energy mangement

The Housing Energy Management Program involves improving the energy efficiency of residential buildings — particularly heating, ventilation and hot water systems. HEMP's 25 projects are adminstered by the Ministries of Energy and Municipal Affairs and Housing.

The projects focus on improving residential windows and window treatments; insulating basements in older homes; microprocessor control of heating systems and heat recovery from boiler rooms; condensation problems; and a review of energy conservation services for multi-unit buildings. As well, a study was done on residential furnace heat distribution systems and performance upgrading.

These and other similar projects will help establish the most practical and cost effective methods of implementing energy conservation techniques.

To ensure a healthy indoor environment, the ministry, in cooperation with several other provincial ministries, is examining moisture buildup and the accumulation of common household contaminants in airtight houses. It is also developing standards for new residential construction.

Low energy homes

A study to assess the marketability of new, low energy homes was launched this year. To complement this project, a workshop was held for members of the building industry.

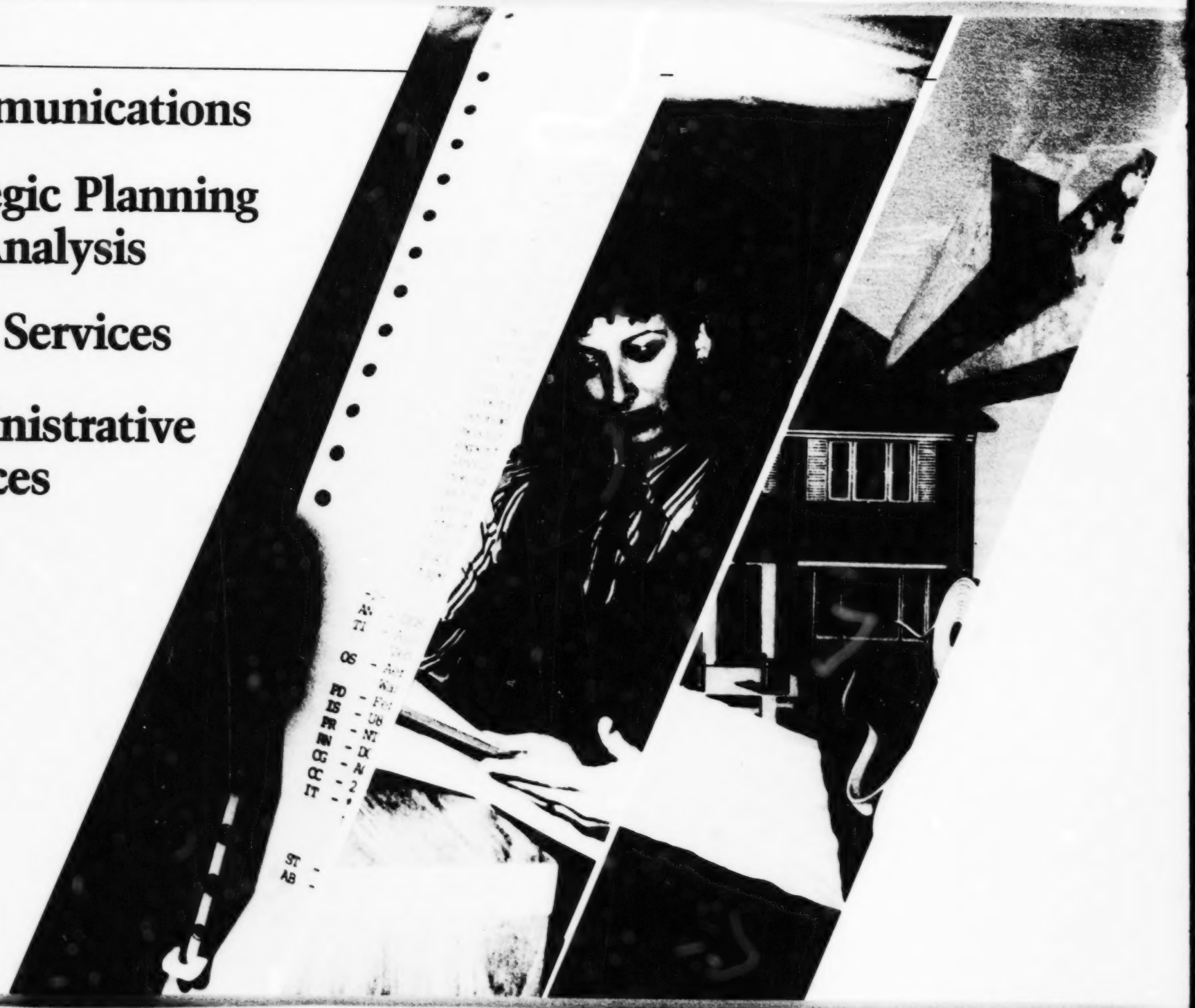
Information to help homebuyers select low energy homes was published, as was an assessment of the conservation potential of older houses. In addition, a grant was awarded to evaluate heat loss in existing home designs. The results will allow a closer matching of furnace size to building heat loss — thereby improving energy efficiency.

Communications

Strategic Planning and Analysis

Legal Services

Administrative Services



Communications

Energy dropped below employment and the economy as major concerns of Ontario residents last year. A mild winter which reduced home heating costs, lower prices at the gas pumps, vigorous advertising by oil companies and stories about world oil gluts combined to put energy issues on a back burner.

But energy supply, price and demand are volatile matters. Helping Ontario residents protect their future comfort and choice in energy matters is the role of the Ministry of Energy. The Communications group plays a major role in ensuring the Ontario public has the information to make informed energy choices.

Since energy was not a prime concern of the general public, the Communications group focused extra efforts on explaining the benefits of particular energy technologies.

The ministry staged a successful conference on Energy from Waste in March, 1983. ENERGO '83 brought together international experts and potential users of energy from waste technology to discuss the recovery of energy from agricultural, forest and municipal waste.

Energy Savers Peterborough (ESP) also began in 1982-83. A wide range of volunteer, private and municipal organizations joined together to promote energy efficiency for individuals and organizations in Peterborough. The program featured relatively low cost, simple energy conservation tips to promote effective use of energy at home, at work and in travelling.

With advice and financial assistance from the ministry to get started, ESP successfully completed its first year of operation. The community decided that the services were so valuable that the project has continued for a second year.

Government-wide constraint played a major role in defining the ministry's communications in 1982-83. Television advertising, significantly reduced in comparison with a year ago, was used in combination with other communications programs to increase coverage and enhance the effectiveness of the messages.

Children, the energy consumers of tomorrow, are a target audience for the ministry's communications messages.

The "Conserving House" television commercial ran during October and November as part of an advertising campaign at hardware stores throughout the province. Two-thirds of the province's retail hardware stores participated, by putting "Conserving House" promotional posters and "how-to" booklets near energy conservaton products such as caulking, weatherstripping and insulation.

This combined advertising gave the consumer specific information and offered local businesses the advantage of government promotion of generic products.

In another advertising campaign, the Ministry of Energy cooperated with the Ontario Motor Coach Association (OMCA) to produce a commercial promoting the energy efficient aspects of bus travel. The ministry bought commercial time during March and April to run "It's More Fun on the Bus."

Individual OMCA members bought additional local air time to run the commercial with specific information about their own company. As part of the campaign, the government and the OMCA also cooperated in producing billboards and posters tied to the television advertising.

Opposite:
Effective program development and delivery relies upon the close cooperaton between the ministry's program areas and Communications, Strategic Planning and Analysis, Legal Services and Administrative Services.

Energo '83 hosted by the ministry, brought together more than 450 experts from Canada, the United States, England and Europe to exchange technical and economic information on energy from waste and biomass opportunities.

Publications, displays, posters and films formed a large part of the ministry's communications activities in the past year. Particular emphasis went into making the publications attractive to both a general and a technical audience.

Two ministry publications, *Energy and Agriculture* and *Let the Sunshine In*, won awards from FORUM, the Ontario government communicators organization. But more than being award winning, sales and distribution figures showed they were well read.

During the year, the ministry mounted more than 40 displays including major exhibits at the World's Fair in Knoxville, Tennessee and in Future Pod at Ontario Place. Enerplex, a 40-foot trailer designed as a set of mini-theatres, highlighted energy through entertaining film featurettes for people attending Ontario's fall fairs.

The ministry also dealt with the public through its public inquiries section, through speaking engagements and public relations contacts with various interest groups and through media relations.

During the year, French language communications were extended. Three television commercials were produced in French. The award winning movie of last year, *Old House, New House* and another ministry film, *Fueling the Future* were edited in French.

Energy Ontario

Energy is a common concern of a number of Ontario government ministries. Many use energy efficiency as part of their own operations and incorporate the message into programs designed for their clients. This is achieved in large part through communications.

Some 15 ministries now have energy programs operating under the Energy Ontario banner relating to the Ministry of Energy as part of its overall responsibility for energy policy.

The messages range from the Ministry of Agriculture and Food's directions on cultivation to the Ministry of Transporation and Communication's DriveSave programs. The Ministry of Municipal Affairs and Housing co-operated with the Ministry of Energy in providing materials for the "Conserving House" promotion.

Strategic Planning and Analysis

The Strategic Planning and Analysis (SPA) group is responsible for analysing and projecting trends in energy prices, and demand and supply levels by major economic sector and fuel type. The group identifies emerging issues and helps guide the development of provincial energy strategies. SPA is also responsible for coordinating the ministry-wide strategic planning process.

In 1982-83, the projections of Ontario's energy demand formed the basis for Ontario's intervention in the Gas Export Hearings of the National Energy Board (NEB). Analysts from the group assisted in preparing the government's position at NEB hearings on the Arctic Pilot Project and natural gas transmission tariffs, tolls and other financial matters. The projections of Ontario's energy requirements were discussed with Ontario Hydro as the utility developed its long term electrical load forecasts.

Unstable conditions in world energy markets during the year generated considerable interest in the semi-annual projections of Ontario's energy prices. Industry, government and individuals use these projections to assess trends in future energy costs and shifts in energy markets.

The group also coordinated the annual ministry review of priorities and allocation of resources among the ministry's different activities.

SPA represents the ministry on the board of the Canadian Energy Research Institute (C.E.R.I.) and was a principal advocate for a C.E.R.I. study of Canadian methanol development options due to be completed in July 1983.

SPA staff participated with other ministry staff in a number of ministry and government task forces and studies including:

- Environmental Assessment of Ontario Hydro Transmission projects
- BILD Committee and Implementation Task Forces
- Rent Review and Conservation Study
- Ontario Hydro Net Income Study
- Municipal Solid Waste Task Force
- Compressed Natural Gas Interministry Advisory Committee
- Management Standards Project
- Parallel Generation Committee

Much of the energy information gathered and analysed is available to the public as well as to other government ministries and agencies. In April, 1982 the ministry published *Weighing the Oil Drop Decision* — an assessment of the financial benefits to homeowners of converting from oil to gas or electricity for space heating needs. Approximately 65,000 copies of this publication were distributed to private citizens and interest groups. An updated version is currently being prepared.

Public information

The *Ontario Energy Review*, a biennial publication, describes the province's energy situtation and summarizes the information that guides energy policy development. Energy demand forecasts, prepared for the Ontario government since 1978, are also published in the Review. The third edition will be published during the summer of 1983.

Ministry reference library

The extensive collection of energy reference material, studies and documents is accessible through either computer terminals or card catalogues. The library staff conduct on-line bibliographic research and maintain information contacts with a large number of libraries, government agencies and professional organizations.

The Stragegic Planning and Analysis group presents the ministry's viewpoint at various hearings where energy is involved.

Administrative Services

The Administrative Services group provides management, support and financial services to the Ministry of Energy. In the area of management systems and services, the administration assures that the comptrollership function and necessary support services are adequately delivered and that the appropriate management processes are in place and utilized.

Administrative Services also provides centralized common support services, word processing, and the coordination of support services provided by other ministries. For example, it deals with the Ministry of Government Services in the provision of office accommodation and with the Ministry of Treasury and Economics for personnel services.

Staff of the Administrative Service section also provide financial information to the ministry and coordinate budgetary control, with accounting services provided by the Ministry of Treasury and Economics.

Centralized word processing, used by every group in the ministry, allows the speedy preparation of accurate documents.

Legal Services

The Legal group provides legal services and advice to the Minister, the Deputy Minister and all branches within the ministry. The ministry's solicitors also draft and negotiate contracts for the ministry.

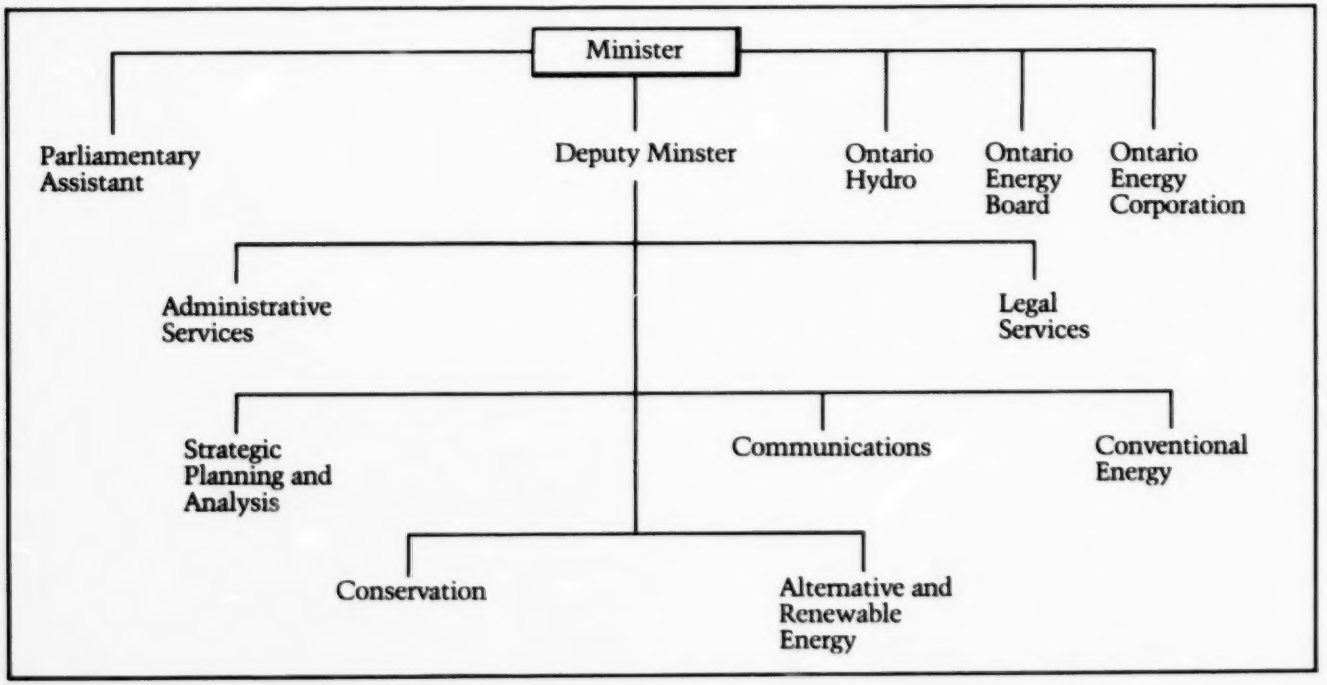
During fiscal 1982-83, major contracts were signed with the Ontario Energy Corporation for research into ethanol and methanol, and with the University of Toronto for the establishment of the Institute for Hydrogen Systems. Negotiations continued to extend the agreement between the ministry, Ontario Hydro and the National Research Council to carry out research into fusion technologies.

The Legal group also represents the ministry before administrative and regulatory boards such as the National Energy Board (NEB) and joint boards under the Consolidated Hearings Act.

During the year, Legal Services represented the ministry at the NEB's hearings related to the Arctic Pilot Project, gas exports and the rates to be charged by TransCanada PipeLines Limited and TransQuebec and Maritimes Pipeline Inc. It also represented the ministry at joint board hearings into proposals by Ontario Hydro to construct the eastern Ontario and southwestern Ontario transmission lines.

Legal Services also advises the ministry on the legal aspects of the ministry's relationship with its three agencies: Ontario Hydro, the Ontario Energy Board and the Ontario Energy Corporation. Legal staff worked on legislation to revise the Power Corporation Act in order to authorize Ontario Hydro's participation in the Bruce Energy Centre project and a regulation was passed under the Ontario Energy Board Act to deregulate the sale of compressed natural gas.

Ministry Organization



Associated Boards and Agencies

Ontario Energy Board (Regulation)
The Ontario Energy Board is responsible for regulating Ontario's natural gas utilities, administering the Ontario Energy Board Act and reviewing Ontario Hydro's electrical rates and structures.

Details of the Ontario Energy Board's activities are contained in its latest annual report, which can be obtained from:
The Ontario Energy Board, 9th Floor, 14 Carlton Street
Toronto, Ontario M5B 1K5

Ontario Hydro (Energy supply)
Ontario Hydro is a public corporation, responsible for the generation and supply of most of the electric power in Ontario. The Ministry of Energy is responsible for maintaining liaison and cooperation between the government and Ontario Hydro.

Ontario Hydro publishes an annual report which can be obtained by contacting:
Ontario Hydro, 700 University Avenue, Toronto, Ontario M5G 1X6

Ontario Energy Corporation (Energy supply)
The Ontario government established the Ontario Energy Corporation in 1974 to stimulate and to invest in Canadian energy projects that improve the availability of energy in Ontario. All shares are held by the Minister of Energy, and operations are conducted under the Business Corporations Act of Ontario.

The annual report of the Ontario Energy Corporation can be obtained from:
The Ontario Energy Corporation, 101 Bloor Street West, 5th Floor, Toronto, Ontario M5S 1P8

Program Estimates Summary

1983-84 Estimates $	*Programs*	*1982-83 Estimates* $	*1981-82 Actual* $	*1981-82 Estimates* $
6,498,800	Ministry administration	6,132,400	3,601,972	3,682,000
3,170,500	Conventional energy	3,218,000	2,504,401	2,673,000
19,639,900	Alternative and renewable energy	25,985,900	11,886,173	12,153,000
22,321,700	Energy conservation	28,862,800	21,258,603	23,603,000
2,639,400	Regulatory affairs	2,326,700	1,862,755	1,710,000
83,000,000	Energy investment	62,240,000	325,000,000	N/A
137,270,300	**Ministry total**	128,765,800	366,113,904	43,821,000
N/A	Less: Special warrant	N/A	N/A	28,478,000
30,500	Less: Statutory appropriations	30,500	325,029,731	27,500
137,239,800	**Total to be voted**	128,735,300	41,084,173	17,315,500
	Accounting classification			
98,020,300	Total budgetary expenditures	66,525,800	41,113,904	43,821,00
39,250,000	Total disbursements	62,240,000	325,000,000	N/A
137,270,300		128,765,800	366,113,904	43,821,000

Copies available ($2.00 each) from the Ontario Government Bookstore, 880 Bay St., Toronto for personal shopping. Out-of-town customers write to Publications Services Section, 5th Floor, 880 Bay St., Toronto, Ontario M7A 1N8. Telephone 965-6015. Toll free long distance 1-800-268-7540, in Northwestern Ontario 0-Zenith 67200.

MasterCard and Visa accepted.

Cheques or money orders should be made payable to the Treasurer of Ontario, and payment must accompany order.

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